APR 8 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. APRIL 7, 1898. CHICAGO, ILL. NUMBER 14

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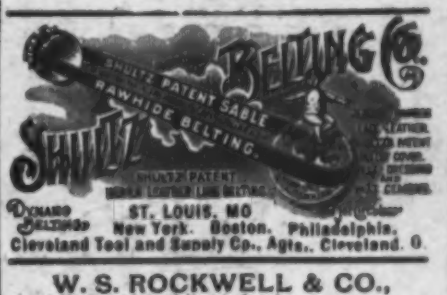
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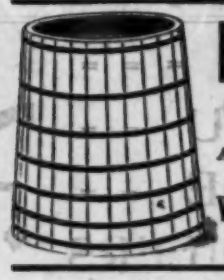

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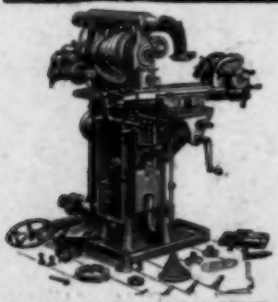

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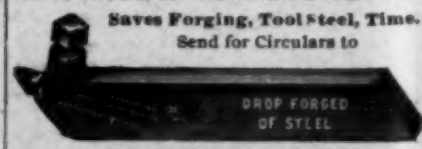

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. APRIL 7, 1898. CHICAGO, ILL. NUMBER 14

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

There is more evidence than in any preceding week that the prospect of war is hurting the iron trade. Under the tension of the past few days, with the certainty that either war or concession would come speedily, the business world has waited just as it waited in the week preceding the election of 1896. War, it is known, will be costly to iron and steel manufacture, in deranging a thousand plans on which the prosperity of the year turns. Dearer money, a measure of restriction in credits, in some lines cancelation of orders, and at least a temporary slackening would be some of the early effects of war. Any increase in values that might come would be a later development. In such a war as one with Spain is likely to be, with no great withdrawal of men from industrial pursuits to take the field, there would be no special disturbance of the labor supply. Doubtless the supply would be greater than the demand, on account of arrested enterprise, and wages would be more likely to fall than to rise. While the business world is not figuring out in detail the proximate and remoter effects of a declaration of war, it recognizes that the issue will soon be known and that meantime contracts can wait. At the same time a large volume of day-to-day and week-to-week business is being done, and the occasional contract of good size that means a steady run for the mill brings concessions in prices. The agreement between Southern furnace firms has been followed by a season of restricted buying. Similarly the tentative arrangement between producers of Bessemer iron in the Central West has been attended by a temporary suspension of buying. The incorporation of the Bessemer Furnace Co.—this is the name by which the new organization is likely to be known—is in the hands of a committee, but probably no step will be taken for the present. Meantime, in spite of the heavy consumption of steel, stocks of Bessemer as of foundry irons, show further accumulation. The proposition to get some concerted action by producers of foundry iron throughout the country, to provide against a surplus or for marketing it abroad and relieving the home trade from the continued incubus is receiving not a little favor. A plan originating in Philadelphia, unfolded by circular to the furnace companies, is recognized as having much to recommend it, but its execution involves some difficulties. Meantime the canvass conducted by a leading pig iron selling firm has brought from between 90 and 95 per cent of the producers of foundry iron assent to the plan for a convention in which the various districts shall be represented by delegates, these to devise some method of relief. It was found in the preliminary investigation that a regular surplus of from 6 to 8 per cent of foundry and forge irons has been produced in the past four or five years. It is probable that the meeting will be called for New York at an early day. Chicago gives the best return concerning sales of foundry iron in the past week, and the first sale of Virginia iron in that market since 1895 is noted. The heavy output of steel from Central Western and Western mills keeps up. No local billets are to be had at Chicago. Flood has interfered with operations about Wheeling, and to some extent in Pittsburg, and in the former district accidents have curtailed output for the time. Billets are on a $15 basis, valley and Wheeling, and $15.25 at Pittsburg makers' mills. Pittsburg and Chicago both note splendid propects for structural tonnage, and mills are busier than for a part of March. Plate business from the East is occupying Pittsburg mills, but the taking of this work from Eastern competitors means that prices are not satisfactory. Railroads keep up their buying on both track laying and rolling stock accounts. Track supplies are closely competed for, however, and a large Chicago contract for splices the past week brought a sharp cut.

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.*
27 VINCENT ST., April 6.

The tremendous total of ore engagements for 1898, as noted a week ago, has been attended with little stir in the freight market. The vessel interest finds nothing to scramble for in the rates offered, on which only the fittest and more recent additions to the lake freight can make even a moderate profit. In the past week 55 cents on Marquette tonnage to Nov. 1 has been done, though 60 cents was the basis of early Marquette business. From Escanaba 45 cents is offered by shippers. All present calculations are on a depth of water that will permit as large cargoes as last year's, and rapid loading and unloading will be more and more a requisite of profitable operation. The Mesabi ores outside of its own, taken by the leading Pittsburg interest, as indicated in this column last week, will make up, together with the Mountain Iron and Oliver outputs, practically the same total as came last year from these two mines—something over 1,300,000 tons. The purchases from the two Consolidated properties, the Duluth and Pillsbury, and one independent mine amount to 300,000 tons. Sales of Mesabi ores in the general market will be under guarantees against decline, either of the ore sold or of others. For Fayal $2.30 is still the asking price.

PIG IRON.—The committee of valley and Cleveland furnacemen appointed to incorporate the Bessemer Furnace Co.—this being the name proposed for the new selling organization for Bessemer iron in the Central West—has taken no action, and probably will not until the latter part of the month, when the war situation and its effect on business can be more clearly defined. The delivered prices—$10.10 valley and $10.65 Cleveland, Lorain and Pittsburg, are maintained meantime on second quarter deliveries, though some iron is quoted at Pittsburg 10 to 20 cents below this basis. There is little doing, however. Sellers of foundry iron are firmer, to the extent that quotations below $9.50 valley furnace for No. 2 are now rarely heard, and on some higher silicon irons $9.75 is asked. Demand is light and buyers who would ordinarily contract at this time are taking small lots. Mill iron holds to $8.75 and $8.85 valley furnace, and 25 cents higher at valley mill, with Southern delivered at 15 to 25 cents above local irons. Lake Superior charcoal sustains the good movement of the past two months, several thousand tons being sold in the last week. Sales have been for some time in excess of production. We quote f. o. b. Cleveland:

Bessemer, second quarter	$10 65	Valley Scotch No 1	$10 65@10 75
No. 1 Strong Foundry	10 65	Valley Scotch No. 2	10 25@10 40
No. 2 Strong Foundry	10 15	Gray Forge	9 40
No. 3 Foundry	9 65	Lake Superior Charcoal	11 50

FINISHED MATERIAL.—The material for the new Rose building, 2,300 tons, is about to be placed, the contract having been let to a local bridge works. The Caxton building will take nearer 2,000 tons than the 1,000 tons originally counted on. The effect of the critical stage of war complications is seen more plainly in the finished material market, and while there is a steady run of orders, the volume is not what was expected of opening spring. In nails and wire the active movement started early in March last year. Some of the recent hesitancy may be attributable to the pending consolidation scheme, but now that that matter is settled the jobbing

trade holds back. The three local plants of the American Steel & Wire Co. are shut down, and new arrangements with labor are proposed, which may meet with dissent from the old employes of two of the plants. While $1.40 has been held, for wire nails, some sales are reported at $1.35, Pittsburg, and this is being met by local mills. Smooth wire is still quoted $1.15. There has been little recent activity in plates in the Cleveland market; 1c Pittsburg continues to be quoted. Bar iron and steel are quieter than of late. On steel 1c Cleveland is minimum, but with extras generally disregarded. Valley mills quote 95c, valley, on iron, though this continues to be shaded on large business with desirable specifications. We quote beams and channels, 1.15c; angles, 1c; plates, 1c, all Pittsburg; No. 27 black sheets, 2.05c to 2.10c, Cleveland. Old material is unchanged at $13.50 to $13 75 for old iron rails; $10 to $10.25 for old steel rails; $11.50 for No. 1 railroad wrought; $8.50 for cast; and $11 for car wheels.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.*
1142 MONADNOCK BLOCK, April 6.

Business is running along very steadily, and gives every promise of maintaining the same gait as far ahead as any one can see. Sales in the week were mostly in comparatively small lots, but these aggregated a large tonnage, and the few good sales made increased the total to something better than an average week. Railroad buying continues to be good. One order for 2,000 cars was given out last week, and others of smaller size, and further car business is pending. The Chicago Post-office job is understood to have gone to a New York contractor. Small orders for structural and bridge material make a good total, and orders on specifications are coming in as fast as the mills can ask. Prices are unchanged all down the list, but are firming up a little, and higher prices on some grades of iron and steel are expected to be announced within a short time.

PIG IRON.—Southern furnaces have had a very good week, and have closed several contracts for round lots, among them one for 2,000 tons and one for 1,000. Local irons were in good demand, but the sold-up condition of the furnaces precluded the possibility of any large sales. The largest, probably, was one of 500 tons. Demand keeps up, and inquiries are in hand for several large lots, and a great number of smaller ones. A sale of 500 tons of Lake Superior charcoal iron is reported. Prices on this iron are lower than have been quoted lately, the quotations we give this week representing the market fairly. The local furnaces are firm in their prices, and are making no concessions. Southern furnaces inside the association are living up to the agreed basis, but those outside are still making lower prices. The outside interests, however, appear to be in better condition lately, as regards sales. Prices are made as follows:

Lake Sup. Charcoal	$11 00@11 50	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 35@10 60
Local Coke Fdy. No. 3	10 75@11 00	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 75@11 00	Alabama Car Wheel	14 00@16 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 35@10 60	Coke Bessemer	11 50@12 00

BARS.—Business appears to be getting better all the time. Sales last week included several large contracts. The agricultural implement manufacturers' business has not come up yet, but a number of the larger makers of implements have found it necessary to make purchases of material to fill in with, and this class of trade makes a good total. Car business has also been good. The car works are all very busy, and have recently taken large orders. Business in bars in small lots continues excellent. The larger mills are getting slightly higher prices for iron now, but a few smaller mills, anxious for business, are making lower prices than those we give, yet on the whole our quotations fairly represent the market. Common iron is quoted at 1.05c to 1.10c; guaranteed, 1.10c to 1.15c; soft steel bars, 1.15c to 1.20c.

CAR ORDERS.—The Union Pacific road has bought 2,000 cars from the Missouri Car & Foundry Co., and several smaller contracts were given out last week. There are no new inquiries in the market, but those mentioned in the last two weeks will probably be placed very soon. Car material is in good demand, and sales are being made every week.

RAILS AND TRACK SUPPLIES.—The demand for light section rails continues excellent, and good sales are being made all the time. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—Nearly all the business placed in this territory is given to Eastern mills and middlemen, as the local mills are not in shape to accept much more. Prices are unchanged at $17.25 for billets and $23.75 for rods.

STRUCTURAL MATERIAL.—The only large contract placed in the week was that for the Chicago Post-office job, which is understood to have been given to a New York contractor. This, it is expected, will amount to 10,000 tons. Bridge business continues good, and several of the railroads centering here have indicated their intention of buying heavily to replace the small bridges on their systems with structures better adapted to stand the heavier traffic that has come in recent years. This class of work is likely to take a very considerable quantity of bridge material in the future. General business in small lots has been good, both in bridge and structural material. The mills are looking for a very heavy season in building. Within two weeks a great many permits have been taken out for high office buildings, because of the new law limiting the height of buildings in this city to 130 feet. Some of these permits are likely to be used, although not immediately. One is for a new 12-story building for Montgomery, Ward & Co. This may go ahead very soon. Quotations are made as follows: Beams, 15-inch and under 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.15c to 1.25c; plates, 1.10c to 1.15c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—Sales the past week included several orders for round lots, and inquiries have been received for further large business, which will be placed immediately. Small order business has been very satisfactory, both from mill and store business. Quotations are unchanged. They are as follows: Tank, steel, 1.10c to 1.15c; flange steel, 1.20c to 1.40c; fire box steel, 1.85c to 5c.

MERCHANT STEEL.—Orders continue large, and the indications are that business will be good for some time. Dealers report some season's contracts closed. Prices follow: Open hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth-finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.50c to 1 60c; tool steel, 5.50c to 7.50c; specials, 11c and upwards

SHEETS.—Inquiry indicates a continuance of the large sales of last week. While a large portion of the business of the week was in small lots, they made a good aggregate, and several contracts of good size were given out. Quotations are made at 2.05c to 2.15c for No. 27 black, and 80 and 7½ to 80 and 10 per cent discount for galvanized.

SCRAP.—The market has been quiet, with only small sales. There is some inquiry for car wheels, and apparently th dealers are not having the easiest time possible in meeting the demand. Holders are asking higher prices than buyers are willing to pay, in a good many instances. Some transactions took place in old rails, and were made at about the prices we give. Dealer's selling prices are as follows:

Old iron rails, gross,	$12 00@$12 25	Axles, net	$14 25@$14 75
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 00@ 9 25	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	11 00@ 11 50	Axle turnings, net	6 25@ 6 75
Railroad forge, net	12 00@ 12 50	Mixed steel, gross,	7 25@ 7 50
Dealer's forge, net	10 50@ 11 00	Stove plates, net	6 00@ 6 25
No. 1 mill, net	7 50@ 8 00	Heavy melting steel gr.	8 25@ 8 50
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	13 25@ 13 50
Malleable cast, net	8 00@ 8 50		

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
608 TRADESMEN'S BUILDING, April 6.

Some good sized orders for rolled products came to Pittsburg mills during the week, and in some other finished lines the heavy buying of material increased rather than decreased under the war cloud. The operation of the local mills is now unusually full, and is being increased from week to week as spring buying gets heavier. The demand for open-hearth billets is particularly heavy. Prices are improving some. In pipe the turn has come, and the larger interests have withdrawn all former prices, preparatory to an advance. Steel bars are also firmer. At Homestead the armor plate department of the steel works has been put in operation on the con-

tract for armor for Russia which was taken some weeks ago.

PIG IRON.—None of the valley furnaces are entertaining prices on Bessemer iron below the furnace quotation of $10 that is to hold while the new arrangement is being perfected. If there is iron to be had from outside holders at a lower price it is not being offered. As to the progress of the combination, it is said that some of the obstacles usually met in such a movement have been encountered during the week, and may alter the scheme originally planned. Its ultimate success is still confidently predicted by the furnaces interested. The advance in gray forge has not so far been tested, but $8.85 in the valley and $9.25 Pittsburg are firmly held. Foundry grades are quieter again. Quotations in Pittsburg are as follows:

Bessemer, valley		$ 10.00
Bessemer, Pittsburg		10.65
No. 1 Foundry	10.40 to	10.50
No. 2 Foundry	10.00 to	10.25
No. 3 Foundry	9.50 to	9.75
Gray Forge, valley	8.75 to	8.85
Gray Forge, Pittsburg		9.25

BILLETS.—The flood of last week caused several days' idleness in Wheeling district mills, and so interfered with deliveries of sheet bars and billets. An accident, since, to the boiler capacity of one of the Wheeling plants is delaying matters again, and Pittsburg mills are too busy to help the situation much. The delay has not caused higher prices so far, and billets are firm at $15, Wheeling maker's mill, and $15.25, Pittsburg. Sheet bars are well sold up, and are again quoted at $17 to $17.25, maker's mills, both Wheeling and Pittsburg. Tin bars are relatively higher.

RODS.—Rods are down again, owing to lower prices on nails, and $22, maker's mill, is quoted.

PIPES AND TUBES.—The turn has come in pipe, and one of the heaviest producers withdrew all prices last Saturday and has since refused business at the old quotations. An advance is more than likely before the week is out, whether the result of agreement or by action of the mills individually. The volume of merchant trade has been heavy, and the mills are in position to refuse further business for a time. The numerous projects for outside work are only waiting for better roads when a big tonnage is looked for—much in advance of recent years. Base discounts are as follows: Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. The additional discounts are 6 tens and 5 per cent on small lots and 6 tens and 7½ per cent on attractive orders. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off.

SHEETS.—Spring buying of sheets is being delayed much longer than usual, notwithstanding that much more is being used than a year ago. In the view of some a rush similar to that of last summer seems more likely as buying is delayed. On all business mills are quoting 2c for No. 28 and nothing below 1.95c is reported. There are still inquiries for deliveries running over the year, but no mill is willing to sell so far ahead. Galvanized sheets are reported much weaker in some quarters. We quote 80 and 5 and 80 and 7½ per cent off list.

STRUCTURAL MATERIAL.—Judging from the sales and inquiries for structural shapes in the last two weeks, this year's building will be larger than for four years, and much larger than last year. Both local mills are busy, one of them on 800 tons of material for the new Consolidated Traction Co.'s building, for which the contract was let last week. The agreed prices on shapes follow: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; angles, 1c; tees, 1.20c; and zees, 1.15c. Universal plates in connection with shapes are selling at 1c; alone, at 1.10c.

FERRO-MANGANESE.—Dometsic ferro-manganese has been so scarce for ten days that the foreign has sold in large quantities—the first time in years. Domestic is quoted by the local producer at $49, and not much can be had at that price.

PLATES.—The steel plates needed on the four ships which the Cramps are building for the Earl Fruit Co., of Boston, were bought of Pittsburg last week, the order aggregating 3,300 tons. Pittsburg also took the first instalment of plates bought for the new East River bridge, and over which the battle between acid and basic open-hearth steel was fought. The bulk of the material has not yet been contracted for, owing to delayed appropriations. The lot placed was 1,700 tons. Universal plates are reported lower and are said to be selling at 1c, but no mill is found willing to quote lower than 1.10c, unless in connection with shapes. The universal mills are said to be very busy. On sheared plates mills quote: Tank, Bessemer and open-hearth, 1c; shell, 1.10c; flange, 1.20c; fire-box, 2c.

RAILS AND TRACK MATERIAL.—Rails are quoted at $18 Pittsburg. On track material we continue to quote as follows: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

IRON AND STEEL SKELP.—Skelp is quoted: Grooved steel skelp, 90c to 95c; sheared steel skelp, 1c to 1.05c; grooved iron skelp, 1.05c to 1.10c; sheared iron skelp, 1.12½c to 1.15c, four months f. o. b. buyer's mill, or 2 per cent off for cash.

OLD MATERIAL.—Little has been done in old material in the last few days. Iron rails sold at $13.50, gross, and steel rails, mixed lengths, at $10.50 and $10.75. Car wheels sold at $10.25, gross and 500 tons of cast scrap at $9, gross. Other prices are: Coil spring, $11.25; heavy melting stock, $10.50; cast borings, $6.25; heavy busheling scrap, $9.75; crop ends, billets and blooms, run of mill, $11.

SPELTER.—Spelter has been sold heavily and prices are stiffening. Quotations are $4.18 to $4.22, and $4.25 has been asked.

CINCINNATI.

April 5.

The extraordinary flood which has prevailed throughout the entire Ohio Valley during the past ten days, has interfered seriously with manufacturing at many of the mills and foundries, and the water recedes with provoking slowness. The consequent damage and destruction have occasioned the district an immense loss in the aggregate. The uncertainty of the maintenance of peace necessarily hinders the free full development of many new enterprises and improvements, but as to just what extent cannot be estimated. Notwithstanding the discouragements and drawbacks, a fair volume of business is being done, and at this writing there is an increase of inquiries and rather more numerous sales. We quote for cash, f.o.b. Cincinnati: Southern coke, No. 1 foundry, $9.75; No. 2, $9.50; No. 3, $9.25; gray forge, $8.75; mottled, $8.75; No. 1 soft, $9.75 to $10; No. 2, $9.50 to $9.75; Belfont coke, No. 1, Lake Superior, $11 to $11.50; Belfont coke, No. 2, Lake Superior, $10.50 to $10.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

BUFFALO.

April 5.

Sales have been light in the past week, and although shipments on existing contracts have kept up to the satisfactory basis noted for some time past, the continued uncertainty of the outcome of the Cuban question seems to be having some effect on sales. With only a few exceptions the orders placed this week have been for immediate requirements. We quote below for cash f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $11 to $11.25; No. 2, $10.50 to $10.75; Ohio strong softener No. 1, $11.50 to $11.75; No. 2, $11 to $11.25; Jackson Co. silvery, No. 1, $14; Southern soft, No. 1, $11.50 to $11.75; No. 2, $11.15 to $11.35; Lake Superior charcoal, $11.50.

THE following were the bids of various armor plate manufacturers on the recent Russian order, which was given to the Carnegie Steel Co. The first two are Sheffield firms: Vickers, Sons & Co., $583.95 per ton. John Brown & Co., $569.38 per ton. St. Chamond, $490 for 9-inch; $498 for 8-inch; $569 for 5-inch; $548 for 4-inch. Le Creusot, $498 for 9-inch; $478.64 for 8-inch; $530.75 for 7-inch; $550 for 5-inch; $569 for 4-inch. Chatillon, $486 for 9-inch; $496 for 8-inch; $517 for 7-inch; $563.50 for 2 and 5-inch. Marrel Freres, $530.75 for 6 inch; and $382.14 for 4 inch. Krupp, $562.52 for all sizes. Dillingen, $559.30 for all sizes. Bethlehem, $530.45 for all sizes. Carnegie, $530.45 for all sizes. Witkowitz (Austria), $452.20 for all sizes.

THE IRON TRADE REVIEW

AND

INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

APRIL 7, 1898.

A SUMMARY of "prospective railroad construction," presented by the *Railway Age*, gives promise of much better things from that source in 1898 than in the lean years just passed through. Our contemporary finds that 375 lines in the country, with an aggregate milage of 20,176, show some signs now that they will be built at some time, at least in part. Since Jan. 1,375 miles of new track have been laid and work is in progress on 90 lines aggregating 2,725 miles (though not all, of course, to be built this year), and in addition 725 miles are now under contract or about to be let. The *Railway Age* believes the new mileage of 1898 could readily reach 3,000, and is not likely to be less than 2,500. If an additional 1,000 miles beyond last year's record can be achieved in 1898 it means the expenditure of $20,000,000 more than in 1897, it is estimated, or a total of $50,000,000 to $60,000,000 on new railway building—a very large part of the amount going directly to labor. It would be impossible to approximate the retarding effect of war, should it come; but new railroad enterprises would be quick to feel the holding back of capital. On the other hand, if war can be averted, these figures concerning new trackage, taken with what is known already of the large purchases for track renewals and for rolling stock, point to a year in which the railroads will come nearer than at any time since 1892 to their old position of chief bulwarks of the iron trade.

EEVENTS are sometimes powerful persuaders. An English contemporary, commenting on Mr. Carnegie's statement, in his recent communication to this paper, that American ship-plates are from $6 to $8 a ton below the Glasgow price, said: "The Americans at present hardly produce ship plates. They produce tank, shell and flange plates, which amount to about the same thing, and such plates are at present quoted at from £4 15s. to £5 10s. per ton at Pittsburg. British manufacturers can produce at these prices, under normal conditions, with a fair profit. We do not, therefore, see that our American rivals are likely to outstrip us at present by any gain in the matter of price." A week later the same paper has a communication from "One Who Knows," saying: "It may interest you to know that 3,000 tons of American steel ship plates were contracted for this week by a Belfast shipbuilding firm, for delivery at Belfast." Whereupon our quickly converted contemporary says: "This is a new omen and one of serious import. Meanwhile, however, our own trade is so good that we have not much cause for complaint." We are attracted both by the candor and the equanimity of the comment.

IRON and steel imports to the United States in January were close to the total for January, 1897. In tin plates, there was a slight increase, but for the seven months ending with January the tin plate total, like others, shows a considerable reduction, compared with the corresponding period of the preceding year. The table is as follows:

IRON AND STEEL IMPORTS TO THE UNITED STATES.—GROSS TONS.

	January.		July—January.	
	1897.	1898.	1897.	1898.
Pig iron	2,591	1,723	17,233	13,418
Scrap iron and steel	404	209	3,227	1,171
Bar iron	1,565	1,947	10,120	10,351
Iron and steel rails	54	140	7,755	479
Hoops and band iron	.....	.....	2	28
Ingots, blooms, etc	1,207	1,336	9,445	9,190
Sheets and plates	217	192	3,191	1,515
Cotton ties	105	.....	7,261	.....
Tin plates	8,186	9,757	59,633	42,344
Wire rods	1,664	1,406	9,319	10,668
Wire	286	277	1,862	1,538
	16,279	16,987	129,048	90,703

SOME of the recent association movements in the iron trade of the United States are being watched with interest from the other side of the water. The attempt to get the Mesabi mining companies into an agreement on price, the organization of Southern furnacemen, and later of merchant furnace firms in the Central West, and the proposed consolidation of wire interests, are cited by one English journal, which queries whether these plans will have any effect on the export trade of this country. The first will not, because it did not come to pass, the market on Mesabi ores being as open as in 1897. The second will not, because it has not contemplated at any time the shutting down of any Southern furnaces; and in any event the export trade from Alabama will be determined largely by the relation between Birmingham furnace costs and the price of iron abroad, and very little if any by the selling price of Southern iron at home. The Bessemer furnacemen's organization will be restrained from putting up prices beyond a narrow margin of profit because it cannot afford to drive consumers of Bessemer iron into building any more furnaces than are now projected. The wire consolidation, in the limited form it finally took, contemplates, as did the more ambitious scheme of consolidation, even a more aggressive foreign campaign than our wire and wire nail manufacturers have made heretofore, following up the advantages secured in the trade of the past year. Our wire nail exports in the seven months ending with January were 7,736 tons, against 3,233 tons in the corresponding period of the preceding year, and of wire, 31,761 tons, against 25,881 tons. The business has been steadily widen-

ing, and with the economies which the consolidation secures and the full operation of plants which is part of the plan, both quantity and low prices are assured. There is little hope, in any of the projects referred to, of a halt in what our outer competitors may well regard as the "pernicious activity" of American iron and steel manufacturers.

Lorain Steel Co. to Succeed the Johnson Co.

Steps toward such reorganization of the Johnson Co. as is involved in the bringing in of new capital for the two blast furnaces, the coking plant and other improvements announced in these columns recently, have been taken the past week. On April 2 articles of incorporation were filed at Columbus, O., for the Lorain Steel Co. The capital stock is $9,000,000, of which $3,000,000 is cumulative preferred stock and $6,000,000 common stock. This company, which will have substantially the organization of the present Johnson Co., will take all the plants and assets of the latter company under an appraisal which has been made. The Lorain Steel Co. willl not operate the property, however, until Dec. 31, 1898. At that time the Johnson Co. is to liquidate all its indebtedness out of quick assets. The new company is to issue $5,000,000 of first mortgage 5 per cent gold bonds, and by the sale of such securities will be provided with ample capital for the work about to be undertaken. About 100 men are at work on the ground now preparing for the furnace foundations. Bids are being received for dredging the Black river, driving piles and making cribbing for the construction of the ore docks. The furnaces, as already stated, will be capable of at least 500 tons a day. The contract for blowing engines which was placed conditionally some time ago will be proceeded with by the Southwark Foundry & Machine Co., of Philadelphia.

At the annual meeting of the stockholders of the Johnson company, held at Lorain, O., Tuesday, April 5, the plan of reorganization was unanimously ratified. As the transactions involved in the transfer of the properties to the new company are to be conducted by Mr. Moxham as intermediary, he resigned as president of the Johnson company. As soon, however, as the transfer is completed, which will be within a few days, Mr. Moxham, as president of the Lorain Steel Co. assumes the direction of the affairs of that company. While title to the property passes to the new company this week, the Johnson company continues to operate the present plant until the end of the year, when liquidation will be completed. As is usual in such reorganizations, payment for the property transferred is made in the stock of the new company.

Other officers of the Lorain Steel Co. are: Tom L. Johnson, vice-president; P. M. Boyd, secretary; W. F. Saltmarsh, treasurer. Vice-President Daniel Coolidge, of the Johnson company, becomes Mr. Moxham's successor as president of that company, and will continue as such through the period of liquidation. The board of directors of the Lorain Steel Co. is not fully made up, but will be within a few weeks. The English and New York capital brought into the new organization will be represented on the board.

New Plant for Charcoal By-Products.

Negotiations are now pending, looking toward the reorganization of the charcoal department of the Ashland Iron & Steel Co., and removal of the kilns to the furnace site at Ashland, Wis. Proposals are being received, also, for installing a chemical plant to recover the by-products resulting from the carbonization of the wood.

Quick Delivery of Ponderous Machinery.

The Frank-Kneeland Machine Co., of Pittsburg, builders of rolling mill machinery, received, on Jan. 5th, an order for a 38-inch blooming mill from the Carnegie Steel Co., Ltd., and made shipment of the completed machinery March 15th, the stipulated time. All patterns had to be made, and the complement of castings, the housings of which weigh 70,000 pounds, the bed-plates 60,000 pounds, and other parts in proportion. Under these conditions it can be appreciated that unusual facilities would be required for the prompt handling of the work received. Since the delivery of the above order the Carnegie Steel Co., Ltd., has given the builders a contract for a hydraulic shear, to weigh 150,000 pounds. During the progress of the above work, the Frank-Kneeland Machine Co. turned out six cold mills and gearing for the United States Iron & Tin Plate Mfg. Co., transfer and shear tables for universal mill for the Granite City Steel Co., an 18-inch skelp mill and automatic shear and tables for Moorehead, Bro. & Co., a 24-inch tin mill for Ellwood Tin Plate Co., two 24-inch mills, doubling and squaring shears for Cincinnati Rolling Mill & Tin Plate Co., three sets of car moving devices for the Carnegie Steel Co., Ltd., coldmill and gearing for Piqua Rolling Mill Co., besides other shears, and a large tonnage of sand and chilled rolls.

Russian War Vessels to be Built in the United States.

The announcement of the arrival of Chas. H. Cramp at St. Petersburg on March 29 is followed quickly by advices that the Russian government is contracting with the Cramps for the building of several warships at Philadelphia. Large appropriations were made by Russia recently for strengthening her navy in view of the recent extraordinary increase in naval armament made by Great Britain. The number of vessels to be built at Philadelphia is not definitely settled, but one statement puts the number as high as six or seven. The armor for such of these vessels as are heavily armored, added to the armor contracts that will come from the United States Government in accordance with the new appropriation for three battleships, will keep the armor plate mills at Pittsburg and Bethlehem busy for many months.

THE next meeting of the Western Foundrymen's Association will be held at the Great Northern Hotel, Chicago, at 7:30 P. M, Wednesday, April 20, 1898. The following topical questions will be taken up in their order: Is it economical to ventilate a foundry artificially? What has been your experience? What is the best method of lighting a foundry of modern design? Have any members of this Association had any experience with Thurston's Autographic Torsion Machine? If so, does it possess any merit over other forms of machines now in use for testing cast iron? In order to overcome the variation in size of test bars incident to molding, is machining down to size to be recommended? What is your experience as to the utility and efficiency of flexible shafting for use with grinders on heavy and intricate castings? Foundrymen are requested to submit information or a discussion of any of these questions to the secretary, A Sorge, Jr., Chicago, and are also requested to submit other questions to be discussed at future meetings, or to furnish reports of experience and phenomena observed in their daily work. In accordance with the by-laws all nominations for officers for the ensuing year must be sent to the secretary at or before this meeting. The annual election occurs at the May meeting.

PERCIVAL ROBERTS, president of the A. & P. Roberts Co., operating the extensive Pencoyd Iron Works at Manayunk, near Philadelphia, died March 30. Mr. Roberts was 66 years of age, and had been in the iron business nearly all his life.

PEABODY, HOUGHTELING & CO., bankers, 164 Dearborn st., Chicago, announce that William R. Stirling, formerly of the Illinois Steel Co., and later of the Universal Construction Co., has been admitted as a partner in the firm.

W. T. HENRY recently went from Carlisle, Ky., to Harriman, Tenn., and purchased a controlling interest in the Harriman Tack Co. The business will be enlarged and new machinery added.

THE Grand Rapids (Mich.) Safety Appliance Co. has been incorporated with $10,000 capital stock, paid in. It will manufacture safety appliances for machinery.

AT Philadelphia, execution issued last week on a judgment entered by the Ætna-Standard Iron & Steel Co. against Charles K. Lippincott, trading as Lippincott & Co., on a judgment note for $4,000, dated Oct. 21, 1897, payable in one day.

COCHRANE STEAM SEPARATOR TEST.

An interesting test was conducted recently by the Edison Electric Illuminating Co., of Boston, to determine the efficiency of a six-inch horizontal Cochrane steam separator, high pressure pattern, manufactured by the Harrison Safety Boiler Works, of Philadelphia. The test was conducted on different lines from those followed heretofore with similar appliances. Calofimeters have been relied upon to determine the quality of the steam entering the separator; but it was demonstrated in the test in question, owing to the efficiency of the separator, that there was more moisture in the steam as it entered than was indicated by he inlet calorimeter. After the preliminary test, as will be seen from the report below, the inlet calorimeter was discarded.

The report is addressed by Chas. H. Parker to A. G. Pierce, superintendent of stations, Edison Electric Illuminating Co., of Boston, and contains the following:

"In the preliminary runs a calorimeter was used on the inlet and outlet of the separator. No practical results were obtained, as a fair sample of steam could not be obtained for the inlet calorimeter. This calorimeter was situated in a horizontal pipe near a bend which seemed to squeeze the moisture out of steam, so that the sample obtained was much dryer than the average of the steam in the pipe, as shown by the amount of water extracted by separator. The outlet calorimeter undoubtedly obtained a fair sample of steam, as it was so close

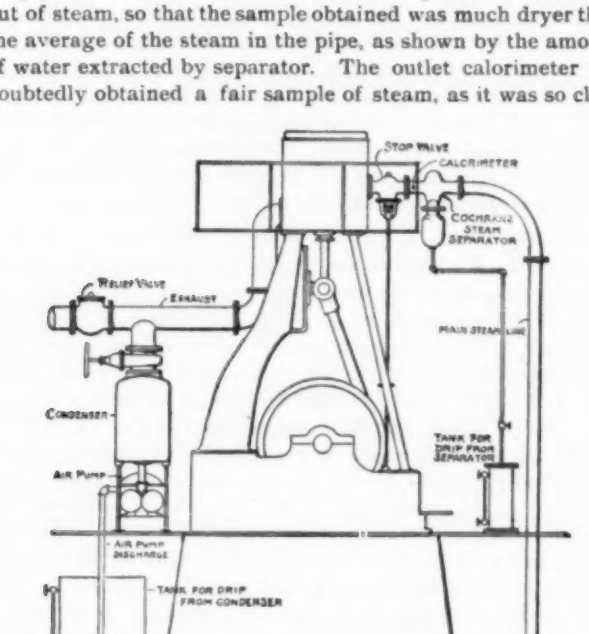


FIG. 1.—DIAGRAM ILLUSTRATING THE TEST.

to the working part of the separator that no moisture could have dropped out.

"Besides, the pipe and separator are thickly covered with magnesia insulation. In the final test, the inlet calorimeter was discarded and the drain of the separator was connected to an entropy tank, a carefully calibrated volumetric tank, having a thermometer well inside to allow taking temperature readings and a gauge glass in front to allow taking volume from attached scale.

The air pump discharge of the engine was run into a tank fitted with a known orifice and a gauge and scale. The scale gave heights above centre of orifice in feet, and tenths and hundredths of feet.

"The head of water in tank was adjusted so that the water entering tank, and the flow from orifice were equal; then, the engine load being constant, the head changed but very little. The load on the engine and the steam pressure were very steady throughout the test.

"Two minute readings were taken on the calorimeter thermometers and the pressure gauge on engine. Five minute readings were taken on the orifice tank and on the entropy tank."

RESULTS.

Length of run	¾ hrs.
Average pressure of steam	158 lbs. per sq. in.
Temperature of upper thermometer in calorimeter on outlet of Separator	378.5° F.
Temperature of lower thermometer in calorimeter on ontlet of Separator	291.7° F.
Normal Temperature of lower thermometer, when steam is at rest	292.9° F.
Degrees cooling as shown by lower thermometer	1.2° F.
Moisture in steam delivered by Separator as shown by cooling of lower thermometer	.06%
Water discharged from Separator into Entropy can, per hour	52 Lbs.
Steam and entrained water passing through engine, as shown by discharge from air pump of surface conden-er	7359 Lbs.
Steam and entrained water entering Separator	7411 Lbs.
Moisture taken out by Separator	.72%
Total moisture in steam (.06 plus .72)	.78%
Efficiency of Separator	92.3%

The noteworthy fact brought out in the report is that the total moisture in the steam entering the separator was 0.78 per cent. and that the efficiency of the separator was 92 3 per cent; in other words, only 0.06 per cent of water remained in the steam leaving the separator. Emphasis is properly laid upon the efficiency of the Cochrane separator in taking moisture from steam where it exists in small quantities only. Results published in 1891 of separator tests conducted at Cornell University showed that these separators became more efficient as the quantity of water delivered to them by the steam was increased. Very high efficiency, regardless of the

FIG. 2.—COCHRANE STEAM SEPARATOR—HORIZONTAL TYPE.

quantity of water present, is the claim made for the Cochrane separator, and the Boston tests strongly support it.

Referring to the unreliability of inlet calorimeters in horizontal pipes, and the inference that might be drawn as to all calorimeters so placed, the manufacturers of the Cochrane separators make this comment in view of the Boston report:

"The calorimeter used in the test referred to on the outlet pipe will give a fair gauge of the amount of moisture present in the steam leaving the separator, for the reason that it is very close to the separator itself, which will take out the water traveling along the bottom of the pipe. The water which has escaped the separator will be carried in the current of steam, and will reach the outlet calorimeter before it has the opportunity of falling. The conditions prevailing will be better understood by considering what happens in the case of the inlet calorimeter. Referring to the diagrammatic illustration (Fig. 1), it will be observed that the steam and water ascend a vertical pipe from the main steam header, which gives the opportunity for the water to become thoroughly mixed with the steam, as its tendency will be to fall back into the steam, and then to be propelled upward; but as soon as the mixture starts to travel in the horizontal direction, the major

portion of the water by its own weight will rapidly fall through the current of steam to the bottom of the pipe and be traveled thence underneath the inlet calorimeter, which will, therefore, not have the opportunity of indicating the full amount of water present. This holds if the calorimeter is inserted into the main line from the side. If inserted from underneath the calorimeter would be affected by the water traveling along the pipe, and show a still more incorrect reading; that is, even wetter steam than was passing."

TWO IMPORTANT CONSTITUENTS OF IRON.

His interesting article in another column makes appropriate one or two extracts from a lecture delivered by Mr. Alex. E. Outerbridge, Jr., before the Franklin Institute in February, 1888. In several of the topics treated in that lecture, which was on the general subject of the relation between the physical properties and the chemical constituents of pig iron, Mr. Outerbridge anticipated a good many points brought out in the discussions of chemical and physical tests, in the various foundrymen's associations of the country in the past few years. We quote from that part of the lecture which deals with silicon and manganese:

"Very recently some light has been thrown upon the subject [chilling] by the aid of chemical analysis, and scientific investigation will doubtless reveal still more clearly what is as yet but dimly seen. It has been found, for example, that the substance silicon, which is always present in pig iron, exerts an extraordinary influence upon its chilling power, and a variation of less than one per cent of silicon is sufficient to make or mar a car wheel; indeed, it has happened that an entire day's work of several hundred men has been spoiled by an excess of one-half of one per cent of this substance creeping undetected into the mixture. The notion has long prevailed (like many other fallacies born of ignorance) that silicon produces 'blow-holes,' or unsound castings, but such is not the case; on the contrary, its tendency is to produce an exceedingly fluid iron, retaining its heat for a long time, owing, I believe, to the fact, not generally known, that the 'specific heat' of iron, rich in silicon, is much higher than a similar grade of metal containing but little of that element. Unfortunately we cannot measure the temperature of molten iron accurately, but I am convinced that pig iron varies in its melting point just as it varies in chemical composition, and that this variation extends through a range of many hundred degrees. It is a modern practice, especially in England, to substitute a small quantity of 'silicon pig' in the cupola for the more expensive Scotch irons, in order to obtain soft castings from a mixture of pig iron and scrap. The proportion of silicon in pig iron may vary from three-tenths of one per cent to three and one-half per cent.

"Manganese is commonly supposed to exert a hardening tendency upon pig iron, but experience has taught me to regard this as another mistaken notion; it undoubtedly produces a marked effect upon the character of the white crystalline structure. You may readily recognize 'a manganese chill' by its coarse lamellar or foliated filaments and by the tendency which it produces to form white iron or 'hard spots' in isolated places throughout the gray portion of a casting. Manganiferous pig iron has been used to produce chilled castings, but it does not make a durable wearing surface: the chilled tread of a car wheel, for example, produced by this method, presents to the eye, when broken through the section, a handsome appearance, but the white metal is comparatively soft; it may be easily bored, and, what is more serious, it crumbles readily under the impact of rapid shocks on the rail.

"A remarkable effect is produced upon the character of hard iron by adding to the molten metal, a moment before pouring it into a mould, a very small quantity of powdered ferro-manganese, say one pound of ferro-manganese in 600 pounds of iron, and thoroughly diffusing it through the molten mass by stirring with an iron rod. The result of several hundred carefully conducted experiments which I have made enables me to say that the transverse strength of the metal is increased from 30 to 40 per cent, the shrinkage is decreased from 20 to 30 per cent, and the depth of the chill is decreased about 25 per cent, while nearly one-half of the combined carbon is changed into free carbon; the percentage of manganese in the iron is not sensibly increased by this dose, the small proportion of manganese which was added being found in the form of oxide in the scoria. The philosophical explanation of this extraordinary effect is, in my opinion, to be found in the fact that the ferro-manganese acts simply as a deoxidizing agent, the manganese seizing any oxygen which has combined with the iron, forming manganic-oxide, which being lighter than the molten metal, rises to the surface and floats off with the scoria. When a casting which has been artificially softened by this novel treatment is re-melted, the effect of the ferro-manganese disappears and hard iron results as a consequence."

THE TIN PLATE MARKET.

The past week has been one of unusual quiet in this line, and no trading of any volume has been done either East or West. This may be directly attributed to the uncertain feeling in all circles regarding the war outlook. This month is usually a very active one in tin plates, but buyers this year are all awaiting developments, and are slow to act even upon purchases for comparatively nearby deliveries. But the fact that there is little business being done has had no tendency as yet to lower prices prevailing a few weeks ago, and sellers seem perfectly content to do little business and await more settled conditions. For deliveries June to December, inclusive, we quote as follows, f. o. b. Pittsburg and Indiana districts:

CHARCOAL TINS.

	IC	IX
Calland Grade, tissue packed,	$4.00	$5.00
Allaway Grade,	3.40	4.30

COKE TINS.

IC, 108 lb.	Basis weight,	$2.85
100 lb.	" "	2.75
95 lb.	" "	2.70
90 lb.	" "	2.65
85 lb.	" "	2.60
80 lb.	" "	2.55

WORCESTER GRADE TERNES.

IC, 216 lb.,	20 x 28	$5.80
200 lb.	"	5.50
190 lb.	"	5.40

For deliveries April and May buyers are asking from 5c to 7½c higher prices than those mentioned above.

Our Production of Wire Rods in 1897.

The American Iron and Steel Association has ascertained from the manufacturers that the production of iron and steel wire rods in the United States in 1897 amounted to 970,736 gross tons, against 623,986 tons in 1896, and 791,130 tons in 1895, showing an increase of 346,750 tons, or over 55 per cent over 1896 and 179,606 tons over 1895. The production of 1897 was the largest in our history. Nearly all wire rods are now made of steel.

Pennsylvania made the largest quantity in 1897, with Ohio second in production, Illinois third, and Massachusetts fourth. Three other States, Connecticut, New Jersey, and Indiana, also rolled rods in 1897. We still import considerable quantities of the finer grades of iron and steel wire rods, particularly steel wire rods, our total imports amounting to 16,415 gross tons in 1897 and to 18,977 tons in 1896, the imports coming chiefly from Sweden and Norway.

The following table, taken from the *Bulletin*, shows our production of wire rods by States during the past four years:

States—Gross Tons.	1894	1895	1896	1897
New England, New York, New Jersey	109,793	113,803	79 733	94,471
Pennsylvania	246,101	278,406	233,352	351,676
Ohio	173 272	210,058	146,329	265,317
Indiana, Illinois	144,236	188,863	164,572	259,272
Total	673,402	791,130	623,986	970,736
Iron	5,772	2,840	2,473	2,019
Steel	667,630	788,290	621,513	968,717

RECEIVED FROM THE TRADE.

John McLauchlan, 810-811 N. Y. Life Bldg., Chicago, manager of the Western offices of the Andrews Bros. Co., and the Finished Steel Co., Youngstown, O., has sent out a little pamphlet describing the products of these companies. The pig iron made by the Andrews Bros. Co. is spoken of highly in several letters of commendation reproduced in the booklet. It is known as "Haselton Scotch," and has been on the market for 29 years. In addition to this the Andrews Bros. Co. makes bar iron, sheet iron and steel, and steel bars, bands, channels, angles, etc. The products of the Finished Steel Co. comprise polished shafting and special shapes, piston rods, pump rods, bridge pins, screw rods, etc. Steel or iron finished by this process is strongly compressed, and, it is claimed, is thereby condensed and made stronger and stiffer than the ordinary rolled bar.

We have received from the Fisher Governor Co., manufacturers of steam pump governors, Marshalltown, Iowa, a very convenient vest-pocket memorandum-book card case which the company has been sending out to the trade.

A monumental undertaking in the direction of publicity through the medium of art is represented in a folio just issued by the Cleveland Hydraulic-Press Brick Co., under the title "Early Religious Architecture of America." The volume, which is 14 x 17 inches, is in reality a series of fine photographic prints on paper of high finish, giving 30 half-tone reproductions of the oldest and most typical piles of Spanish church architecture to be found in America. Mexico, New Mexico and Southern California have been canvassed for the subjects, and Mr. Wm. H. Hunt, general manager of the Cleveland Hydraulic-Press Brick Co., himself an enthusiast on old architecture, visited many Spanish-American cathedrals and missions before the selections were made. First place is given to the oldest church in America, the Church of San Miguel, at Santa Fe, built about 1615. Other views include the Cathedral of Mexico, Mission of San Diego, Cathedral of Chihuahua, Church of Santa Cruz, while all the missions and churches of note in the Spanish settlements on the North American continent are represented. The work is one of the most sumptuous art souvenirs ever attempted as an adjunct to business, and is in a high degree creditable to the ambitious and successful company bringing it out.

A recently issued price list of Bassett, Presley & Train, of Cleveland, employs the notched edge index as a ready means of reference to the various lines of material on which sizes, prices and other details are given. In the warehouses of the company are carried all forms of merchant iron and steel—sheets, pipes, tubes, plates, machinery and tool steel, angles, hexgaon steel, carriage and agricultural works supplies, etc. The company issues monthly stock lists showing the quantity and sizes carried in warehouses, of tank and heavy sheet iron and steel, light common and cold rolled sheets, galvanized sheets, boiler, tank and sheet iron rivets, tubes, shafting, key steel, large round, square and flat bar iron, round and square machinery steel, etc.

"Friction and Lubrication" is the title of the latest leaflet of the Joseph Dixon Crucible Co. The lubricating value of Dixon's pure flake graphite is the theme.

Under the title "Fan Motors" the General Electric Co. has issued from its press at Schenectady, N. Y., a handsomely printed pamphlet describing its 1898 fan motors for alternating and direct currents. The company has manufactured electric fans since the early days of the electric motor, and its '98 models give the results of its long experience. The pamphlet will be sent on application.

Agitation for Steel Cars in Great Britain.

The British Iron Trade Association in a recent issue of its *Bulletin* makes a statement of the economy and other advantages of steel freight cars, and commends it to the attention of railway managers in Great Britain. The steps taken for the adoption of this improvement in the United States are already stimulating interest on the other side. How prompt the English railway officials will be to imitate, is another question. An English exchange, in quoting the figures we have recently presented, as given by the Schoen Pressed Steel Co., pointing out the economies of steel cars capable of carrying 50 tons of freight, says: "We do not, of course, absolutely commit ourselves to the accuracy of these comparisons; but if they are anywhere near the mark, they certainly prove that our railway companies in Great Britain are missing chances of economy that are of great importance. No doubt there is another side to the question, as we have just suggested; but that other side does not appear to us to have been so prominently put forward asthe traders of this country have a right to expect. The iron and coal trades are more largely interested in this matter than any other class of the community, both in view of possible reductions of railway freight, and in view of a large possible increased home demand for iron and steel for railway purposes. The reconstruction of our rolling stock in iron and steel would provide a large additional business for our iron and steel works, and one which could be relied on as regular and permanent."

British Iron and Steel Prices.

The following table printed by the London *Iron and Coal Trades Review* in its issue of March 25, gives current prices of iron and steel products in various districts of Great Britain, as compared with the corresponding time last year:

	March 24, 1898	March 17, 1898	March 18, 1897
IRON ORE—	s. d.	s. d.	s. d.
Rubio, Middlesbrough	14 3	14 3	15 3
" Cardiff	14 0	14 0	14 6
Pottery Mine, North Staffordshire	12 6	12 6	12 6
Hematite, West Coast (at mines)	11 6	11 6	11 6
PIG-IRON—			
No. 3 foundry, Middlesbrough	40 6	40 9	40 3
Warrants, "	40 3	40 7	40 0
Scotch warrants, Glasgow	46 1	46 4	45 1
Hematite warrants, West Coast	49 0	49 5	48 1
Cold blast (foundry), South Staffs	105 0	105 0	105 0
Welsh hematite, Cardiff	51 6	51 6	52 0
MANUFACTURED IRON AND STEEL—	£ s. d.	£ s. d.	£ s. d.
Marked bars, South Staffordshire	7 10 0	7 10 0	7 10 0
Common bars, " "	6 0	6 0 0	6 0 0
Steel Rails, Middlesbrough	4 0	4 10 0	4 12 6
" West Coast	4 10 0	4 10 0	4 12 6
" Cardiff	4 10 0	4 10 0	4 12 6
Steel angles (eng.), Middlesbrough	5 10 0	5 10 0	5 12 6
" " Glasgow	5 12 6	5 7 6	5 5 0
Steel plates (ship), Middlesbrough	5 8 9	5 8 9	5 0 0
" " Glasgow	5 15 6	5 10 0	5 7 6
Tinplates, Bessemer I. C. Cokes, South Wales	s. d. 10 0	s. d. 10 0	s. d. 10 2
COAL AND COKE—			
Best Welsh Steam, Cardiff	11 0	11 0	9 3
Best Welsh Yorkshire, London	10 0	10 0	9 6
Coke, blast-furnace, Middlesbrough	13 6	13 6	13 6
" " Cardiff	16 0	16 0	14 6

The Real Saving in Electric Driving.

At the last meeting of the New York Railroad Club the paper by Mr. Gibbs on electric transmission of power in shops was presented and discussed. The discussion was only moderately valuable, partly we suppose, because so few people have had much experience with the use of electric motors in machine shops and partly because that experience has necessarily been brief. It is worth mentioning, however, that the main point of Mr. Gibb's paper was almost ignored in the discussion, namely, that the question of fuel saving is of slight importance. It may be nothing, or it may be only a small percentage of about two per cent of the total cost of running the shop and it quite disappears in the effect of the use of motors on the output. That after all is the main question—the increase of economy and efficiency of the men and machines. Generally speaking, the question of power absorbed in running line shafting or in conversion and transmission by electricity is of quite minor importance as compared with the question of saving labor by better disposition of the machinery.—[Railroad Gazette.

THE Westinghouse Electric & Mfg. Co., of Pittsburg, has established a regular training school for its apprentices. It was planned by Philip Lange, superintendent, and there is a long list of applicants waiting to enter. Apprentices are taken on a three month's probation, being paid five cents an hour; if satisfactory they are promoted and paid eight cents an hour. Apprentices more than 21 years of age receive 10 cents, and serve three years, while those younger serve four years. Wages are advanced each year, and at the expiration of the term of service, each is paid $100 additional. Engineering, draughting, mechanics and electricity are taught while the student is being paid.

CARBON AND SILICON IN PIG IRON.

TO THE EDITOR:

I have noted with much interest the discussion in your issue of the 24th, by Messrs. West, Sorge, McDowell, and Ferguson, and it has occurred to me that possibly a few words from a furnaceman's standpoint might be of value.

In the first place, I don't agree with Mr. West, in his statement, that "the carbon should be wholly ignored." As far as the general foundry trade goes, and general brands of foundry iron are concerned, I quite agree with him; but when it comes to making castings, which have to be of great density and tensile strength, the claim that the carbons can be wholly ignored, does not rest upon a sound basis. For instance, I will submit the analysis of an 19-inch roll just turned out in the foundry of this concern.

Silicon,	.75
Sulphur,	.10
Phosphorus,	.47
Manganese,	.33
Graphitic Carbon,	2.84
Combined Carbon,	.50
Total Carbons,	3.34

This roll, which was admirable, as far as good qualities go, being exceedingly tough and dense, contained 80 per cent of iron produced at this furnace, wherein the normal carbons run from 4.10 to 4.25. Does Mr. West think that if the normal carbons had been present, it would have been possible to make so good a roll. If he does, I shall be greatly surprised; the more so, as he is looked upon as an expert in that particular branch of the foundry business.

On the other hand, I don't agree with Mr. Sorge in his claim, that "carbon is the most valuable constituent of iron." Of course, as he justly remarks, iron in its cast condition is caused by a combination of iron and carbon; without the carbon, cast iron would not be cast iron. Nevertheless, the one instance that he gives to prove that carbon is the most valuable constituent, is not strictly foundry work, in the commonly understood and accepted meaning of the term. Of course, malleable iron casting is a branch of foundry work, yet, I venture to say that when the foundry business is referred to, one naturally thinks of gray iron casting.

The one feature of Mr. Sorge's remarks I fully agree with is, that "the value of high carbon iron in malleable work is caused by the intense heat, which can be generated by the carbon present in pig iron." I would say, in support of this theory, that it has only been a few years since Bessemer iron was considered "off color" if it had less than 2 or 2½ per cent silicon in it, and the generally accepted theory was that the iron in the converter derived most of its heat from the combustion of silicon. Nowadays, Bessemer furnaces are supposed to run from 1 to 1¼ in silicon; in other words, the heat in the converter is obtained from the carbon. Furthermore, this is the opinion of our customers who are using this iron for making malleable castings.

I don't believe, however, that any practical founder will agree with Mr. Sorge in his remark that "the higher the carbon contents of the iron, the greater its fluidity." Every furnaceman knows that No. 1 iron, high in carbon, runs very stiffly, and with the evolution of a great deal of "kish," or graphitic carbon. Experiments carried on at this place would seem to indicate that a medium carbon, with fairly high phosphorus contents, 1 and 1¼ per cent, will give the greatest fluidity. Silicon in such iron should be 1½ to 2 per cent; and this brings me to Major McDowell's remarks:

His proposed table, while it will be of value, no doubt, to the foundryman, would, if accepted, entail an arbitrary standard of values on furnacemen, which would not be in the least just. Take, for instance, the manufacture of chemical castings. This concern has furnished a considerable quantity of iron for such work, and it has been found universally that comparatively low silicon iron—1.30 to 1.50 per cent—with phosphorus, manganese and sulphur within the Major's limits, gives much better results than the higher silicon iron. Now, what the foundryman wants is results. If the furnaceman can give him an iron that will furnish these results, why should he not pay as much for this iron as for the higher silicon iron, which does not possess the properties which he is after. I mention this particularly, because it has come up several times within the last year. It seems to me, in this connection, that Mr. Ferguson's remarks concerning the education of foundrymen cover the ground. If they will tabulate for themselves a series of analyses, which represent the best in each of their lines of castings, and then call for an iron that will possess that analysis, taking into consideration, of course, the changes occurring in the cupola, that would be much the most satisfactory arrangement that could be arrived at. Such a table as suggested by Major McDowell, would give a man making machinery casting, and work of that class, an enormous advantage in price over shops turning out lighter work where higher silicon metal must be used.

On the other hand, the Major's remarks concerning the value of silicon to the average founder are certainly borne out by facts; but what I want to insist upon is that no hard and fast rule of this kind can possibly be employed.

Neither do I quite agree with his remarks concerning sulphur. Sulphur in a limited degree is a most valuable element, acting as it does very strongly to make combined carbon. I don't believe that its presence in quantities over .12 is ever advantageous, and it is only in exceptional cases that it ought to go so high. But I think that any one who tried to make a roll, either sand or chilled, without calculating on using fairly high sulphur would very soon want to know "where he was at." Furthermore, I should like to call the Major's attention to one of the most celebrated gun metals in Europe, namely, that produced at Finnspong. There the sulphur habitually runs over one-tenth.

Speaking as the representative of one of the furnaces, which makes and sells iron on guaranteed analysis, I can assure Major McDowell that his idea that "the more confused the foundryman gets, the better the furnaceman likes it," is a mistake. As far as my acquaintance with the trade goes, and it is somewhat extensive, I have yet to meet any one making and selling pig iron on the basis of guaranteed analysis, who is not anxious that foundrymen should tell him exactly what they want. It is much easier to supply a man who knows what he wants, and is willing to pay for it, than it is to furnish iron to the average rule-of-thumb foundryman, who blames everything on pig iron, and never thinks of making an analysis of coke, or of his resultant castings, to see where his trouble really arises. Chemistry will not cure all the troubles attendant upon foundry business, but it certainly will go further towards curing them than any other method so far devised.

While I am on this subject, I want to say a word in regard to the habit a great many foundrymen have—men, too, who employ chemists, and ought to know better—of analyzing one pig out of a car. It is a well known fact that iron will vary considerably in its contents, especially silicon, from the beginning to the end of a cast. Now, it all depends on what the furnaceman calls an average sample, as to whether the analysis accompanying a car load is correct or not. Suppose, for instance, that samples for use in the laboratory are taken each two or three beds, as the iron is running, then drilled and mixed in equal proportions; that would as surely give an average analysis of the cast as anything well can, and that is the method pursued by a number of our furnaces. Speaking from personal experience, I can say emphatically that by using this method in the nearly three years we have been in blast, we have only had two disagreements as to analysis, and in both cases the furnace chemist has proven correct, when drillings were taken from 50 or 60 pigs.

There seems to be a prevailing opinion among a good many of our foundrymen, that furnacemen are more or less of a piratical set, anyhow, and attach entirely too little value to the analyses they send out. I don't believe that this impression is warranted by the facts, for the simple reason that it does not pay a furnaceman, who has regular customers, to run any risks of losing valuable trade, for the sake of getting off of his yard a few casts, all of which are sure to go sooner or later anyhow.

GUY R. JOHNSON.

Embreville, Tenn., March 28.

The Duluth, Missabe & Northern Road has given a trust deed for $5,000,000 to the Central Trust Co., of New York, to secure an issue of bonds. The proceeds will be used to retire existing bonds, amounting to $3,500,000.

ELECTRICITY IN A BICYCLE PLANT.

At the time of its installation two years ago reference was made in these columns to the electrical equipment of the factory of the Miami Cycle & Mfg. Co., at Middletown, O., where 1,200 high grade Racycle wheels are manufactured each week and 600 men employed. Some recent views of the operating departments of the works are presented now, this installation illustrating the good results obtained by connecting each section of shafting to its own motor. The factory is a three-story-and-basement brick building, about a mile distant from the station of the Middletown Electric Light & Power Co., from which the electricity is brought over wires strung on poles. It reaches the factory at 1,000 volts and passes into six 40 h. p., one 20 h. p. and two 10 h. p. transformers which reduce the pressure to 115 volts. The large transformers furnish the current for the motors; from the three smaller the lighting circuits are run.

The largest room in the factory is the machine and tool room, Figs. 1 and 2. This contains three lines of 3-inch shafting, each 210 feet long and each connected to a 20-h. p. motor. From the shafting belts are dropped to the different machines—lathes, drills, shapers, milling machines, emery wheels, planers, grinders, gear cutters, punch presses, hub machines and screw machines, a total of 84 machines. In addition to these an oil separator, two oil pumps and a high pressure blower for the forges in the blacksmith's shop are also driven by the motors. By means of friction clutch pulleys the three lines of shafting may all be connected together.

The 26 machines in the drill room, Fig. 3—drills, grinders and milling machines, as well as a band saw, a circular saw and a lathe in the pattern room—are driven by a 10-h. p. motor. Another 10-h. p. motor operates all the machinery in the frame department. In two of the cuts is illustrated the economy of floor space in the use of the motor. In Fig. 2 the motor is placed on the otherwise unused cover to a stairway. In Fig. 3 it is slung from the ceiling on a platform.

The double polishing frames in the polishing room require two 30-h. p. motors. These are boxed in and are belted to two lines of 2¾-inch shafting, each 93 feet long. Another 30-h. p. motor in this room drives a large suction fan which takes up the dust from the polishers. In the plating room two plating dynamos are driven by a 5-h. p., and another 5-h. p. motor in the assembly room drives 110 feet of 2-inch shafting for a number of small machines, and operates in addition a 3-ton elevator.

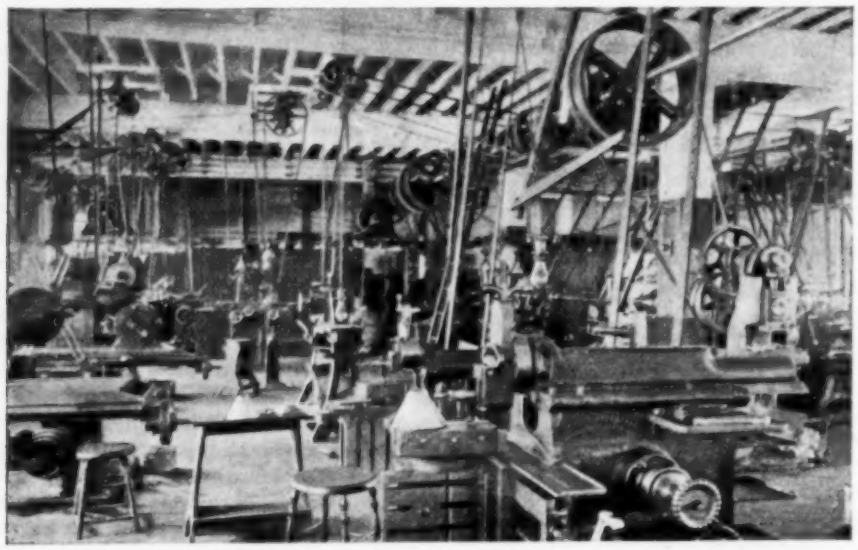


FIG. 1.—SOUTH SECTION MACHINE ROOM.

The electric system employed is the monocyclic system, an alternating current system, introduced by the General Electric Co., by which motors and lamps may be run from the same circuits, change of load on the motor circuits not interfering with the light of the lamps. The motors are induction motors, with no commutator, brushes, collector rings or moving contants. Three small wires fastened to three binding posts bring the current to the motors, which run at a constant speed. They demand no attention beyond an occasional oiling, and are for the greater part of the time called upon for much more power than that for which they are rated. As there is no jar on the floors from any steam engine, heavy pulleys and belts, all the machinery runs without vibration. and the manufacturers assert that to the absence of vibration and the constant speed of the motors the satisfactory operation of their plant and the finish of their product is almost entirely due.

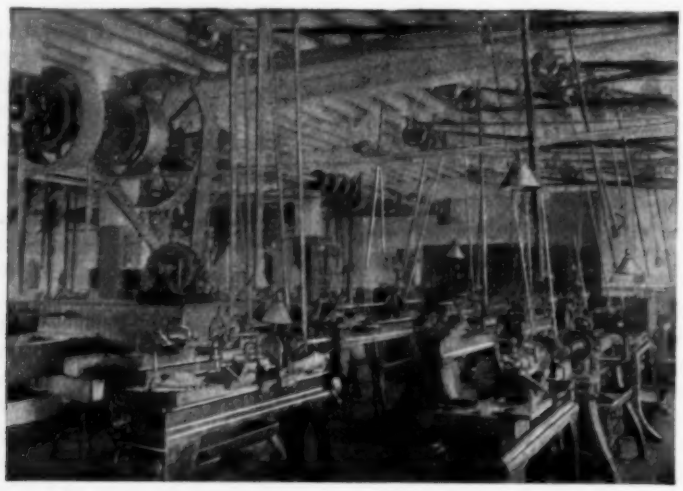


FIG. 2.—NORTH SECTION MACHINE ROOM.

MENACES TO BRITISH TRADE.

We are not exaggerating the grave menace which foreign competition is to British trade; indeed, it would almost seem as if the boasted supremacy of the British workshop, even in pet industries of the land, were a thing of the past. Sir Edward J. Reed, in a letter to the London *Times*, recently related how he saw a shop full of new machinery at an engineering works on the Clyde, "American made," although it was such as is produced in Leeds; how he saw two very fine steel forgings, "made in Germany," which cost between £100 and £200 less than they would in Sheffield itself, the natural home of the steel industry; and how he found that a certain forging of very special design, which could be produced only out of the very best materials, and by the very best workmen, was being "made in Germany" for a Thames firm, the pattern being sent from Germany.

In recent visits to the Continent and the United States he had opportunity to observe the equipment and character of the establishments which now threaten British trade. When he saw the shipyards and engineering works at Hamburg and Stettin, he, and other members of the Institution of Naval Architects, "began to wonder how we were to hold our own without some ameliorations and conditions of labor in favor of British employers."

In New York he found capitalists and commercial men confident of speedily underselling British coalmasters, ironmasters, and engineers, both in foreign markets and also in their native country. The anticipation appears to be justified by the perfection of the equipment, and the abundant use of labor-saving appliances in American factories; and he instances the Newport News Shipbuilding & Dry Dock Company's works at Newport News, in Virginia, which, he admits, he would find it hard to match in all respects on his own side of the Atlantic. Even in France, which Englishmen generally regard rather as an agricultural than a great competing manufacturing country, he found that in many sections of engineering work British products were entirely falling out of the competition.

The warning from Sir Edward Reed ought to carry great influence with the workmen; he is an eminent engineer, and is therefore well qualified to estimate the various complexities of the problem; but he is also a sincere and a warm friend to the laborer, whether of high or low degree. The unions err through ignorance, rather than from malice; but their organization often renders them masters of the situation, and, we must educate our masters. There is glorious opportunity here for talent, if wisely employed, but it must be used quickly or the chance will be altogether gone.—[Francis G. Burton in Cassier's Magazine for April.

THE secretary, Bennett H. Brough, announces that the annual meeting of the Iron and Steel Institute will be held at the Institution of Civil Engineers, Great George st., London, May 5 and 6, 1898. At this meeting the Council will present their annual report for 1897, and a number of papers will be read and discussed. The Autumn meeting of the Institute will be held at Stockholm under the auspices of the Swedish Association of Ironmasters (Jernkontoret), Aug. 26 and 27, 1898. Excursions to places of interest in the vicinity of Stockholm will be arranged; but in view of the limited railway and hotel accommodation in the mining districts there will be no official visit to the iron works and mines.

AN exchange says: "It will not be long until the motive power officials and other mechanical railroad officers will recognize the economy of gas engines in railroad work. The gas engine obviates the use of boilers, steam pipes, coal and much unnecessary labor. They require but little space, a minimum amount of attention, are clean, and in a few words compact. They can be utilized in many ways, viz., in operating dynamos for signal work, pumping water, running lighting plants and general shop work. In many locations they are more economical than the steam engine and are more efficient."

THE compilation of railroad gross earnings for the month of February as made by the *Financial Chronicle*, shows an increase over the same month last year of almost five million dollars, or nearly 14 per cent. Out of the 131 roads reported only 20 showed decrease. This increase is compared with a decrease of $320,000 by 130 roads in February of 1897. The Northern Pacific leads with almost $500,000 increase, and the Illinois Central comes close behind; then the Rock Island, the St. Paul, the Missouri Pacific, the Great Northern and the Oregon Railroad & Navigation all have about a quarter of a million increase, more or less, and the Canadian Pacific has $216,000. The month was a particularly good one in several ways. The grain movement and cotton movement were heavy and the weather was favorable.—[Railroad Gazette.

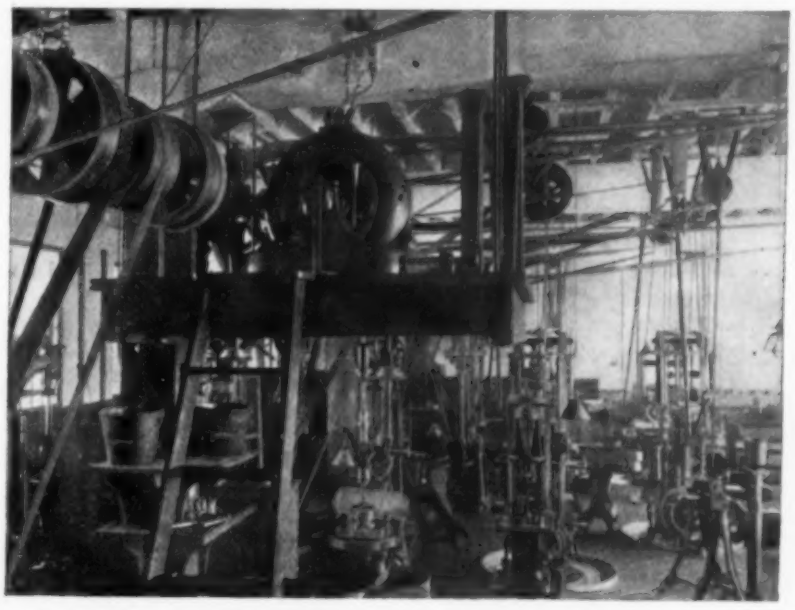


FIG. 3.—DRILL ROOM.

GEO. P. NICHOLS & BRO., Monadnock Block, Chicago, agents for Pawling & Harnischfeger, Milwaukee, have just sold a specially designed crane to the Midvale Steel Co., of Philadelphia, for handling ingots at forge hammers in the manufacture of large shells for the Government. The Midvale Steel Co. now has eight Pawling & Harnischfeger cranes in its plant. Among other recent sales of Geo. P. Nichols & Bro. are a 30-ton crane to the Cincinnati Edison Co., a 15-ton crane to the Imperial electric Light, Heat & Power Co., of St. Louis, and a 15-ton crane to the Beloit, Wis., plant of Fairbanks, Morse & Co., of Chicago.

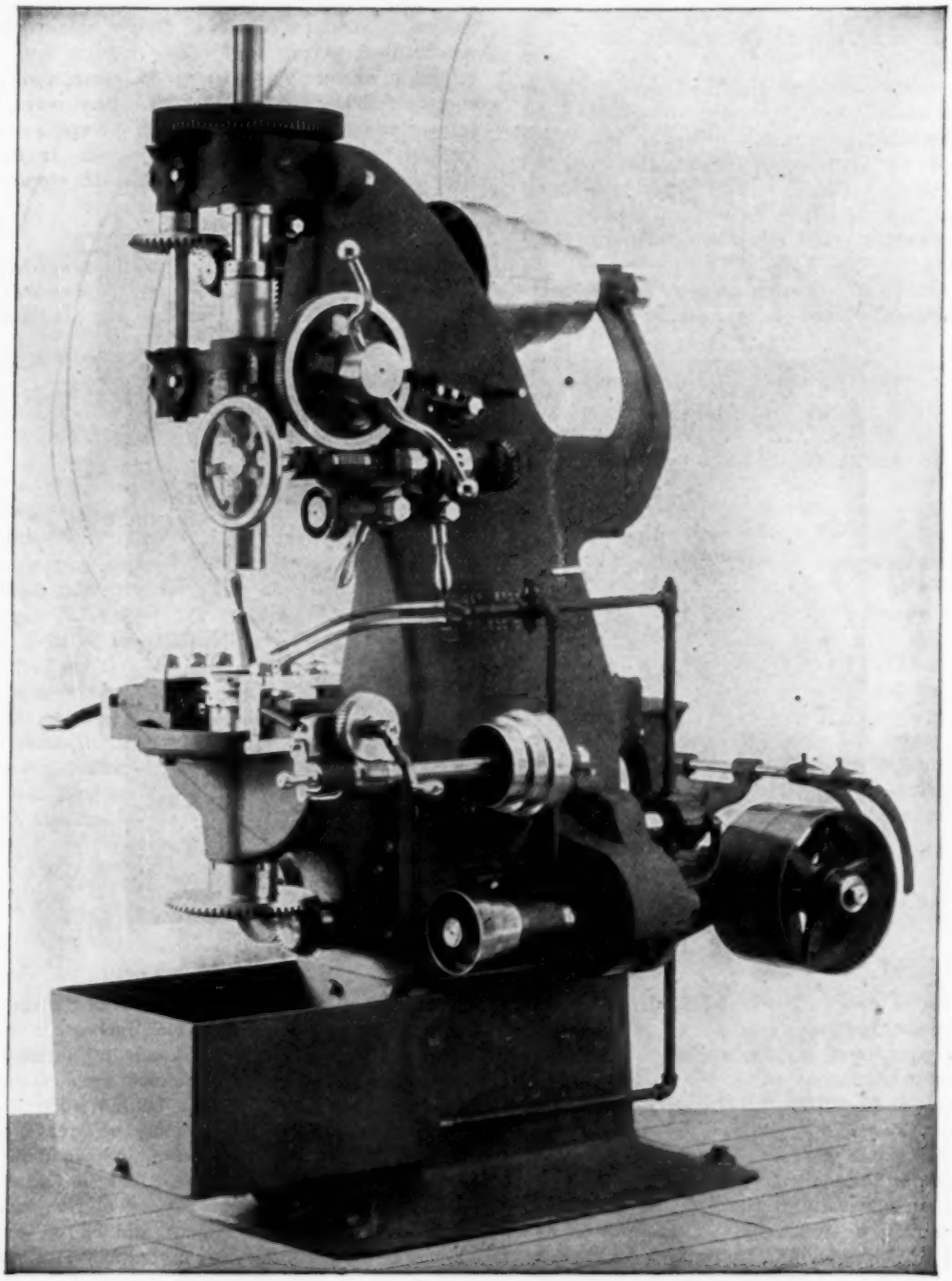
THE Westinghouse Air Brake Co. has received an order for 500 sets of air brakes for cars and locomotives on the underground railway in London.

TURNING AND BORING MACHINE.

The illustration shows a new machine designed more especially for finishing bicycle sprocket wheels, but equally well adapted for other work requiring chucking, counterboring, facing and tapping while the outside is being turned. The machine is shown with upper spindle adapted to move up and down, but not arranged to revolve. This is particularly adapted to turning and boring detachable bicycle sprockets and similar work having a large diameter to be counterbored, also for facing sprockets. The same machine is arranged for drilling any size hole from the smallest to two inches in diameter, or counterboring up to four inches, while at the same time the outside is being turned. A reversing mechanism is furnished for tapping.

The main frame is all cast in one piece and cored out, and its shape and construction are such that no springing can take place. When arranged for drilling, the upper spindle has four changes of speed and three changes of feed, and has a vertical movement of eight inches. The spindle is 2⅛ inches in diameter, is made of crucible steel and has patented hardened tool steel ball thrust bearings on the quill, which is 3¼ inches in diameter. The spindle is counterbalanced by a weight hung on the inside of the main frame. The spindle has power self feed, lever feed, hand worm feed, automatic stop and quick return. The arrangement is such that any of these feeds can be used independently of the others.

A bracket or knee is mounted on the front of the main frame and carries a revolving hollow spindle which is in alignment with the upper spindle. This hollow spindle is $2\frac{1}{16}$ inches in diameter with a $1\frac{7}{16}$-inch hole running clear through it. It has a bearing in a removable bushing and the end thrust is taken up by threaded collars. This spindle has three changes of speed, any one obtainable instantly by moving a lever. On the top of the knee are mounted two slides carrying the forming or turning cutters. The one on the right has power feed with three changes and an adjustable automatic stop mechanism. The slide on the opposite side carries the finishing cutter and is fitted with hand feed.



SPROCKET TURNING AND BORING MACHINE.

An oil pump of improved design carries the oil from a tank fastened to the front of the machine, and flexible metal tubes are furnished for conveying the oil to the cutters. The oil is strained through a perforated false bottom in the tank, thence through a strainer in the pipe. A drain pipe conveys it back to the tank from the chip pan above.

The machines can be operated in gangs of two or more. They are so arranged that one or more can be belted from the main shaft, as each machine has an independent countershaft

mounted on the back of the main frame. The tight and loose pulleys are 12 inches in diameter and 3½ inches face and are designed to run 350 revolutions a minute.

The manufacturers are Baker Bros., Toledo, O.

AMERICAN GAS ENGINE PRACTICE.

In the current issue of the *Engineering Magazine*, Mr. Geo. Richmond writes of "The Gas Engine in American Practice." He admits at the start that until recently an account of American gas engines would have been but a repetition of the description of European types and not the most modern types at that. Immediately after the expiration of the Otto patent, the writer says, the American market was flooded with engines whose chief distinction was cheapness. This came in part from simplifying details, but chiefly from reduction in strength and over-rating of capacity. He finds a healthy reaction, however, and predicts that in a short time high-grade gas engines will be sold in the United States at less per horse power than in any country in the world. This will be brought about by manufacture in quantities and by excellence of design and workmanship, making high rotative speeds possible—but not by niggardliness in parts and proportions. The writer says that while electrical distribution of power would have proved a serious rival to the gas engine had the latter been confined, as at first, to small engines, electricity now promises to be a most valuable ally, which will lift the gas engine into serious rivalry with the steam egnine itself. He believes that when reliable gas engines of 1,000 h. p. and upwards can be operated with from one-half to three-quarters pound of coal per horse power per hour, we may look for the gradual displacement of the steam engine in power houses. Various types of engines are described and illustrated in the article, these including the Westinghouse, the Case and the Nash. In the concluding portion of the description these details are given:

For the ignition of the charge the Nash engine employs either the hot tube, or the electric spark, or both. The Westinghouse employs only the spark, but supplies each cylinder with a duplicate apparatus. This recognition of the element of uncertainty in artificial ignition emphasizes the desirability of abolishing it altogether.

The Westinghouse engine governs by throttling the charge, while maintaining a constant composition of the mixture. The result of this is that at light loads, the compression being reduced, the efficiency of the engine is reduced, but at the same time, there being no misfires, the speed regulation is much closer than is possible by the hit-and-miss principle. This sacrifice of efficiency to close regulation indicates the intention of applying the engine chiefly to the generation of electricity.

Several examples of direct-connected engines and dynamos are given. The Nash combination employs a very ingenious arrangement for converting irregular into regular rotation. The engine, of which the regulation is effected by the orthodox hit-and miss principle, runs permanently faster than the dynamo with which it is connected by frictional contact. If the speed of the dynamo increases, an arrangement equivalent to a fly-wheel governor relieves the grip of the shoes and allows more slip. When the springs and counterweight are nicely adjusted, the sensitive and prompt action of this arrangement is astonishing, and it can be criticized only on the score of its excessive ingenuity.

One result of this arrangement, which appears singular until the cause is known, is the circumstance that, as more lights are put on, the brighter and steadier they burn. A little consideration will show that, the greater the load, the tighter the grip, and therefore the greater speed (and voltage) to release it; moreover, with greater load there are fewer misfires, and therefore there is less variation for the frictional connection to take care of.

The Westinghouse two-cylinder engine has a provision for distributing the shock of the explosion by means of a spring connection between the engine and dynamo. With the three-cylinder engine, however, the necessity for a flexible coupling is believed to be obviated, and, since this type also has its moving parts well balanced, it is preferred by the Westinghouse Company.

There is an evident determination to solve the problem of "direct connection" in some form or other. In the meantime the link belt run slack, together with a fly wheel on the dynamo, offers a solution which is effective and will not be abandoned until the various substitutes have shown that the necessary sacrifice of simplicity is warranted by the results. So far as the writer knows, no independent tests have been made public, with the exception of one at Stevens Institute last year on a Nash engine, according to which the quantity of gas consumed per brake horse power was 17.62 cubic feet, which is equivalent to a thermic efficiency of 20.6 at brake. For starting the larger engines the Westinghouse Co. employs the reservoir of compressed air, but with the addition of a very neat automatic valve arrangement, by which one cylinder is run for a few revolutions as a compressed air engine. The Case engine introduced a rather bold method of starting by firing a cartridge of rather slow-burning powder, converting the engine for the initial stroke into a gun.

Precisely why, in the present state of the art, so much money should be spent in getting out a new gas engine, is not entirely clear. One reason, probably, is that the designer generally starts out with a great contempt for what he considers the clumsy and empirical methods of the gas engineer. The first $10,000 is spent in imparting to him a few elementary ideas on the subject, the second in trying his revolutionizing modifications, the third in getting the engine to run as economically as others in the market. Even scientific Germany does not appear to be exempt from this process. The first Diesel engine was built without a water jacket, compounding is even now being experimented with at great expense, and to these ancient and distinguished fallacies is added a third,—the isothermal combustion elaborated with a quasi-scientific and solemn minuteness intended to be admired rather than understood.

For quick returns no improvement has been made on the old combination of a fine model and a limited knowledge of the art to which it belongs, the latter being essential to enable the inventor to promise, with the force of personal conviction, the extravagant results necessary to induce capital to take the desired "flyers."

English Shop Overflow for American Works.

Recent reports indicate from England that the engineering trades throughout have more work offered than they can handle. This is especially the case with the leading machine-tool makers, who cannot guarantee early delivery. It is likely that considerable work will have to be sent abroad, and that American works will be benefited. Inquiries are numerous for all descriptions of machine tools, both light and heavy, many orders being behind owing to the recent engineering dispute. Locomotive works in England are also said to be exceedingly busy, many of the leading builders having more than sufficient work to carry them over the present year, and some well into the next. Stationary engine builders are also busy, and orders are entered almost daily. The number of American machinery houses that are being represented in England is increasing, and the majority of them will be benefited by the activity in the engineering trade. At present considerable estimating is going on, and the outlook is promising. The work being estimated for by London concerns is principally for foreign demand.

Some Quick Work in British Shops.

In the inaugural address of President Webb, of the Manchester Association of Engineers the following statements occur: "A firm of shipbuilders on the Clyde with 'Mushet' steel drills, running at 300 revolutions, drill two holes per minute, 13-16 inch diameter, through steel plates 1¼ inch thick, the drillings coming through so hot that strong paper is burnt when held underneath. They grind the drills three times in 12 hours. A firm at Bolton turn iron shafting 25.5 feet per minute, turning a shaft 3.25 inches diameter, 22 feet long, in one hour, turning a 32-foot rope pulley for 40 ropes, 1¼ inch diameter, in five days and five nights. A Glasgow firm finished a shaft 19 feet long, 15¾ inches diameter, one coupling, 31 inches by 3⅓ inches, from the rough forging in 30 hours. They also bored a 90-inch cylinder at the rate of 2⅛ inches per hour straight through without stopping, the cutters being sharp at the finish. A 96-inch cylinder, at the rate of 3 1.16 inches per hour, feed six cuts to the inch."

SOME CURIOUS FACTS CONCERNING SILICON, MANGANESE, ETC.

BY ALEX E. OUTERBRIDGE, JR.

The statistics of production of metals and minerals in the United States for 1897 show that this country has forged to the front very rapidly in recent years, so that it now surpasses all other nations in the output of iron, copper, coal, and other so-called "economic" metals and minerals, as well as in production of the precious metals.

The list of economic metals is quite a long one, yet I propose to endeavor to show herein that it is nevertheless incomplete, and that many thousands of tons of certain metals are produced annually in this country which are not noted in any of the official or other published lists. Moreover, I have observed during a long course of years a progressive increase in the annual production of these unclassified metals.

Not wishing to mystify the reader further, I will explain at once that I refer especially to silicon and manganese contained in pig iron. The table of analyses of different grades of pig iron given by Major McDowell in his recent address before the Western Foundrymen's Association (published on page 16 of *The Iron Trade Review* of March 24, 1898), shows that silicon ranges from three per cent in "No 1" foundry pig iron down to one per cent in "No. 9," or even less. The silicon in "No. 4" is given at 2 to 2.25 per cent, and it may therefore be safe to assume for this calculation that two per cent represents, approximately, the average content of silicon in the pig iron produced in the United States in 1897.

We are informed by Mr. Birkinbine, in his address before the Federated Canadian Mining Institute, Montreal, Can. (*The Iron Trade Review*, March 17, 1898), that the output of pig iron in the United States in 1897 amounted to 9,652,680 gross tons. Assuming a sufficient approach to accuracy in the estimate here given of the average content of silicon contained in this pig iron, we find by a very simple calculation that this country produced no less than 193,053 gross tons of silicon in 1897, of which no account is taken in the statistical tables of metals and minerals.

Even if we should strike off one-half from our estimate, which would surely reduce it to a minimum allowance for the average content of silicon in the pig iron, we would still have nearly 100,000 tons of silicon produced in 1897, or more tons weight than that of all the gold, silver and several other metals added thereto! The tendency of modern furnace practice is, I think, to increase the percentage of silicon in pig iron since the foundry men have learned the value of this element as a softener, instead of regarding it as a bugbear as heretofore.

In an address given before the Franklin Institute ten years ago, I called attention to the marked influence of silicon as a softener, and gave there some representative tables of analyses showing the average composition of pig iron, steel and malleable iron. It has been my province, both before and since that time, to make frequent, I may say daily, determinations of silicon in pig iron of various grades from various parts of the country, and of the content of silicon found in castings made therefrom. Ten years ago I still found it necessary to use a considerable proportion of "ferro-silicon" in certain work in order to bring the silicon in the castings up to a certain desired percentage of that element. Of recent years, owing to the gradual increase of silicon in nearly all foundry irons, I have not only found it unnecessary to continue to use a specially high silicon iron in order to accomplish this purpose, but even have been obliged, sometimes, to resort to special methods to reduce the silicon in the castings to the desired point.

I agree with Major McDowell in his views regarding the value of silicon from a metallurgical standpoint, but I differ from him with respect to the financial point of view. Is it not easier and cheaper for a modern hot-blast furnace using average ores to produce soft gray foundry pig iron containing two per cent of silicon or over, than it is to make soft gray foundry pig iron containing one per cent of silicon or under?

Is it not true, moreover, that any furnace that can guarantee to furnish such soft gray iron low in silicon (less than one per cent), can obtain a higher price for it on that very account? Such iron can be used for car-wheel castings and for other purposes for which ordinary foundry iron, containing two or three per cent of silicon, is not suitable.

With respect to manganese, Major McDowell's table shows a variation from .8 to .4 per cent in different grades of pig iron. Assuming half of one per cent as a fair average, we have (applying our rule) nearly 50,000 tons of manganese produced in 1897, and not accounted for in the statistics.

This element is greatly maligned and misunderstood by foundrymen as a general rule. It behaves very differently under different circumstances, and with different kinds of iron. Experiments made 15 years ago satisfied me that under suitable conditions the effect of manganese added in a ladle of molten metal was to cause a large proportion (nearly one-half) of the combined carbon in pig iron which is low in silicon to revert to the graphitic form. The strength of test bars made from metal so treated was increased from 30 to 40 per cent; the depth of chill was decreased about 25 per cent, and the shrinkage was decreased about as much. These tests were made with car wheel iron, which differs materially of course from ordinary foundry iron.

If this method of calculation shall be applied to the other well known elements in cast iron, viz., carbon, sulphur and phosphorus, it will be found that it will be necessary to add several hundred thousand tons to the tables of mineral products in the year 1897. Of course, there is a fallacy in this argument which is only here suggested as a curious and perhaps original or novel line of thought. The various elements in pig iron are not isolated, but form an integral part of the metal, and they are collectively, though not individually, accounted for in the total weight of pig iron produced. The point of special significance which such a calculation enables me to elucidate is the fact, not generally known or understood, that the average composition of the pig iron produced to-day differs from the average composition of 20 or 30 years ago quite appreciably. The pig iron to-day contains, perhaps, on the average one per cent more silicon than formerly, and this would mean therefore that, taking the output of iron last year as an illustration, there were 96,526 gross tons more silicon produced than would have been found in a similar quantity of pig iron made 30 years ago. Comparison of analyses of different grades of iron of the present day with those of similar grades made a generation ago will, I think, confirm this statement. The foundrymen have made marked progress since that time, and their literature has kept pace therewith; but it is true, nevertheless, that in the feverish haste to bring to public notice supposedly new discoveries a good deal of "unripe fruit" has been gathered which has withered almost immediately. After a while some sharp pruning will have to be performed in order that the budding tree of foundry knowledge may put forth only healthy sprouts.

When one investigator finds that an infinitesimal amount of aluminum added to cast iron in a ladle produces marvelously beneficial effects of omnibus character, and others fail to discover any such results; when one finds that pouring test-bars or castings with dull iron makes them stronger, and others find the reverse; when one finds that shaking test-bars or castings in a bag or barrel not only changes the carbon in the metal from the combined to the graphitic form, or vice versa, but actually in some mysterious manner increases the total carbon in such castings, while others find nothing of the kind; and while there are scores of other similar contradictory observations and statements spread upon the proceedings of technical societies and published broadcast in this country and in Europe—it is evident that there is need for a good deal of pruning before we can be sure that we have cut off all dead wood.

Philadelphia, Pa.

SEVERAL lodges of the Amalgamated Association have included in their list of suggestions to be submitted to the annual convention in May, the adoption of the base box system proposed by the American Tin Plate Co. By this means the matter will at least be discussed and favorable consideration is expected from tin plate workers.

THE B. & O. receivers will lay 31,000 tons of new rails, 75 and 85 pounds to the yard, in the next few months. The 10,000 tons recently placed with the Illinois Steel Co. are for lines west of the Ohio River. When all the new track laying is completed, there will be a new double track from Grafton to Baltimore.

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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

The Francis & Nygren Foundry Co. has commenced operations at 545, 547 and 549 W. 15th st., Chicago, making a specialty of semi-steel machinery and anti-acid castings. The officers of the company are William Francis, president and treasurer; Wm. Nygren, vice-president and superintendent, and Geo. E. Allison, secretary.

Charters were granted last week to two new Pittsburg companies. They are the Standard Heating & Radiator Co., of Pittsburg, capital $1,000, of which the directors are Dennis Hayes, of Avalon; Alexander M. Carson and John C. Beckfield, of Pittsburg; W. F. Neely, of Allegheny, and John M. Curry, of Ingram. And the Walters Stove Co., of Sharpsburg, capital $25,000. Directors, Charles A. Walters, Pliny S. Pierpont, Charles W. Walters, Stephen A. Bright, of Sharpsburg, and John Hagmaier, of Allegheny.

The New Castle Brass Foundry, of New Castle, Pa., has been organized by Nicholas Muse and Thomas Humphreys. The old plant of the Keystone Plow Co. has been secured and the new concern will be ready for business at once.

A charter has been issued to the East End Manufacturing Co., of Pittsburg, capital $25,000. Incorporators, J. H. Felmer, Presley P. Murphy, Joseph R. Paull, Edward Watson and J. F. Hulton.

J. R. Alsing Co., 60 New st., New York, ask prices on bending rolls to bend plates eight feet long, three-eighths inch thick, to six or seven feet diameters.

W. O. Lankford, Princess Anne, Md., will buy a gasoline engine six to eight h. p.; new or second-hand.

F. M. Heinig, 426 West Green st., Louisville, Ky., is in the market for a second-hand electric motor of three to five h. p.

It is reported from Allentown, Pa., that the German-American Steel Ball Co. will certainly be located in that city. The German plant is one of the largest steel ball manufactories in Bavaria. It is expected that 228 machines, with a capacity of 1,000,000 balls a week will be added, making a weekly capacity of 4,000,000 balls. Several sites have been offered at Allentown. The local directors of the company voted to increase the stock from $200,000 to $300,000. Gen. Snyder and Morris Hoats, of Allentown, go to Europe at once to complete details for the transfer of the industry.

At Superior, Wis., the proposed municipal lighting plant will have a power house 50 x 100 feet, three 125-h. p. compound condensing engines, three 16 x 72-inch water tube boilers, three 100 arc light dynamos, one 150 incandescent light alternator, together with all necessary appurtenances for the generation and distribution of the electricity; estimated cost, $75,000.

New Construction:—

The Hilton Bridge Construction Co., Albany, N. Y., has been awarded the contract for the steel construction work for the General Electric Co.'s new iron foundry, at Schenectady, N. Y. The building will be of steel frame construction, with brick filling, 140x500 feet, with an annex 100x120 feet, to be used as a cleaning room. The fan method of heating will be used. Contracts for equipment will not be let at present.

The Union Bridge Co., New York, has the contract for constructing coaling stations for the United States Navy at Dry Tortugas and Key West, Fla. There will be two marine piers at Dry Tortugas and one at Key West; cost, $590,000; work to be completed in six months.

The East & West Railroad Co., Cedartown, Ga., is building a machine and wood shop 35 x 120 feet.

Construction work will begin at once at Anderson, Ind., a dispatch says, on the new plant of the Monroe Scraper Co., of Arthur, Ill., which has been led to locate at Anderson in

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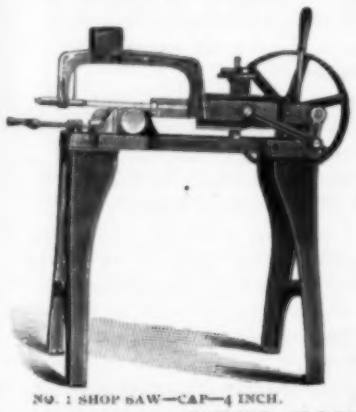

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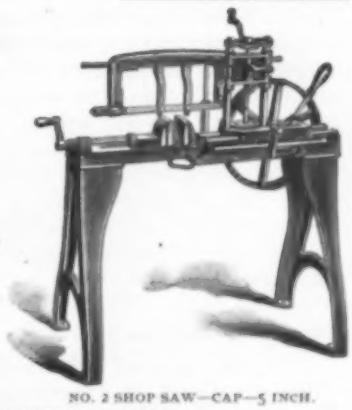

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SAN FRANCISCO, John Woodlock, 26 Beale St.

consideration of free gas and free land. Anderson is also negotiating with the Mitchell-Trantor Co., of Covington, Ky.

At Shawano, Wis., G. L. Kreuger and C. Scharr will build a machine shop.

A proposition is under consideration by the Coraopolis, Pa., board of trade for the location of a high-grade tool steel plant.

Additions, Enlargements, Removals, Etc.:—

The Stirling Boiler Co., of Barberton, O., will build an addition 80 by 240 feet. Hydraulic riveting and hoisting machinery will be installed, and a new 10-ton electric traveling crane. Switching arrangements are such that the crane will be used for loading direct into cars. At present 150 men are employed, or 60 more than when the plant started eight years ago. The company is shipping to Japan, South America, South Africa and Canada.

The Sharon plant of Graff & Co., stove manufacturers, is to be removed to Monongahela, Pa., and the capacity increased.

The new drydock is to be built by the American Steel Barge Co., at West Superior, alongside the present dock, and will be large enough to accommodate a boat 550 feet in length and 55 feet beam. The cost is about $150,000. The company has expended over $80,000 in actual improvements on its plant this winter. The machine shop recently finished represents $30,000, and the powerful electric crane a large sum. The company has also put in a new electric lighting plant, pneumatic riveting and calking machines and other expensive equipment.

At St. Charles, Ill., ground has been broken for the 80 x 150-ft. addition to the Moline Malleable Iron Works.

A. C. Miller, of Chicago, has purchased the Worman-Schule bicycle factory and will remove it to Akron, O., where the old Empire Mower and Reaper Works will be occupied. Akron and Cleveland capitalists will be interested in the new company that will be organized.

An addition 40 x 70 feet is being built to the plant of the Milwaukee Malleable Iron Co., for the use of the molding department. The company is running 122 hours a week. The Centerville (Ia.) Foundry & Machine Mfg. Co. is preparing to add a building to its foundry department. It will be 90 x 100 feet, two stories high.

Fires and Accidents:—

A dry kiln collapsed at the plant of the Pennsylvania Car Wheel Co.'s plant in Allegheny, last week, injuring a number of workmen.

At the Wheeling Iron & Steel Works at Benwood, W. Va., a battery of boilers exploded early in the morning, April 4. One employe was killed and several badly injured. The boiler house was wrecked. The plant will be idle for 10 days.

Fire at the wheel foundry of the Lima (O.) Locomotive & Machine Works, March 30, almost completely destroyed that department.

The recent fire at Wm. F. Gurley's Iron Works, Marion, Ind., caused a loss of about $7,000; fully insured.

General Industrial Notes:—

The Pennsylvania Steel Co., which furnished the first three sections of the Boston subway, has taken the contract for the fourth section.

Fraser & Chalmers, Chicago, have sold in a year Siederholm boilers aggregating over 4,000 h. p., and now have orders on hand for seven additional boilers ranging from 240 to 350 h. p. each, to be used for mining and pumping purposes.

The cold roll equipment of the new 30-mill tin plate plant which the Shenango Tin Plate Co. is erecting at New Castle, Pa., will consist of 28 cold mills, arranged in a manner embodying a new departure in cold rolling practice. The mills are to be arranged in four trains tandem of three 20-inch mills each, with four trains tandem of four 22-inch cold mills each adjoining them. By this arrangement there will be seven separate lines of feed and each black plate will pass between four pairs of cold rolls instead of three, as has been the common practice hitherto. It is believed that a better finish will be imparted to the black plates by this method. Moreover, the less pressure required by passing the plates through four times will ease the strain on the housings and rolls. The arrangement will involve no extra hand labor, as the feeding will be automatic.

Westinghouse, Church, Kerr & Co. have received the contract for the installation at Columbus, of an electric light plant, to be supplied by the Westinghouse Electric & Mfg. Co. The latter company has also received orders for a gas engine for the Commercial Milling Co., of Detroit, Mich.

H. K. Porter & Co., are building a small locomotive for the United States Government, to be used in the Brooklyn Navy Yard, for the handling of the big guns and other heavy articles used on board the warships.

The Cambria Iron Co., Johnstown, Pa., declared a quarterly dividend of two per cent, payable April 1.

Among other changes in the operating department of the American Steel & Wire Co. are the transfer of John McIlvreid

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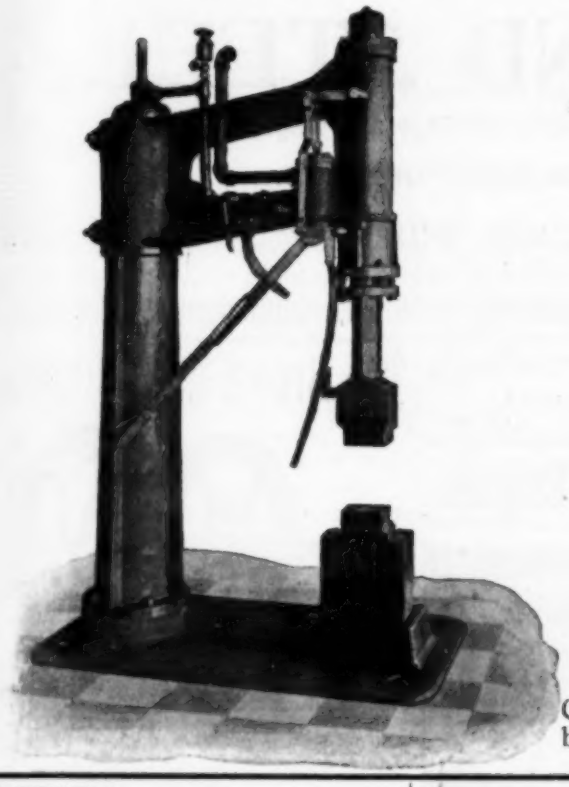

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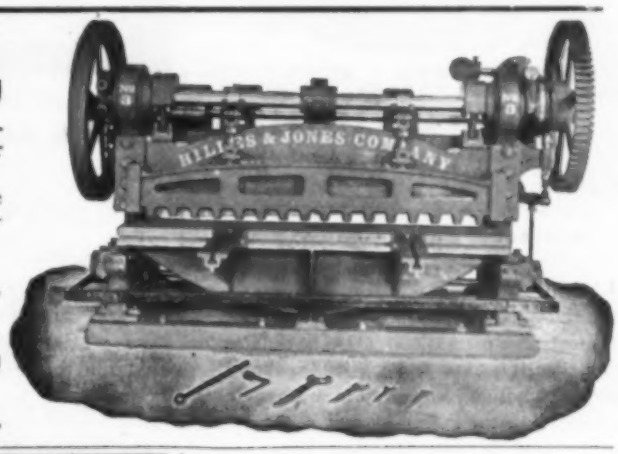

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from the Beaver Falls plant to Rankin, Pa., and the assigning of Robert Garvey, superintendent heretofore at Anderson, Ind., to the Beaver Falls plant.

At Duluth, March 31, the Central Trust Co., of New York, began suit to recover $1,766,653 from the stockholders of the West Superior Iron & Steel Co. The suit is to recover a defficiency judgment for the amount stated and to establish a statutory liability. The trust company, it is said, is acting for minority stockholders who do not appear in the reorganization. The several plants of the West Superior Iron & Steel Co. were sold on Feb. 7 last under a mortgage foreclosure to the Wisconsin Steel Co., for $60,000. This price is considerably less than that figured on by certain stockholders. The bonded indebtedness of the steel plant is $1,826,653.

The capacity of the Griffin car wheel plant at Tacoma, Wash., has been increased and its facilities much improved recently. Air hoists have been added and more wheel pits provided, with other new equipment. Orders have been booked that will permit steady operation. The daily capacity is 150 chilled wheels.

At Philadelphia last week a bill was filed by the J. W. Paxson Co. against the Gray's Ferry Foundry & Boiler Co.,

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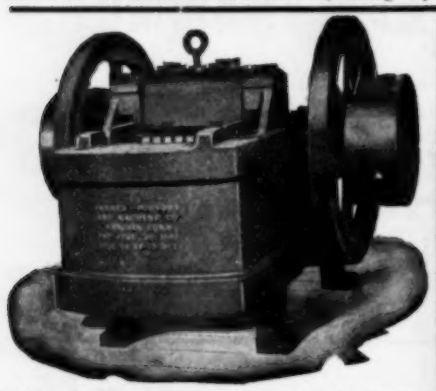

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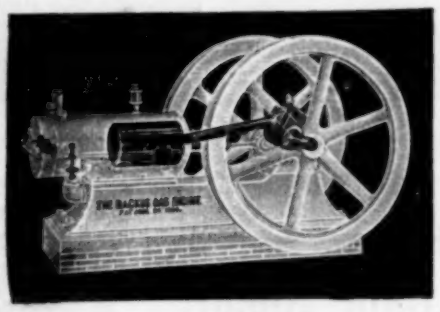

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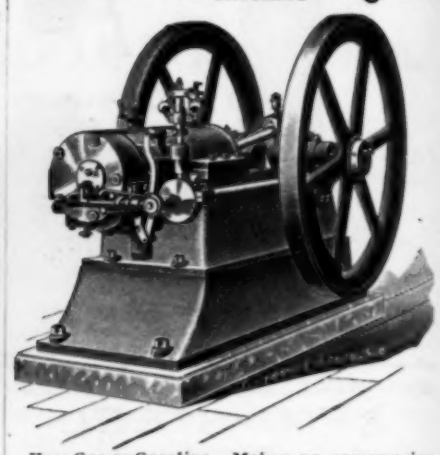
The Brown GAS AND GASOLINE Engine.



Uses Gas or Gasoline. Makes no compression while engine is running idle. Charges fired with electric spark tube igniter. Made upon honor and fully guaranteed. Write for description and prices.

Columbus Machine Co.,

COLUMBUS, O.

Ltd., in which the court is asked to appoint a receiver for the defendant company. Its shops and real estate are subject to a mortgage of $25,000; the J. W. Paxson Co. is a creditor in the sum of $2,210.32 for goods sold and delivered, and the foundry and boiler company owes other debts amounting to $24,000 and upwards.

A dispatch from Madison, Wis., says that the Gisholt Machine Co., of that city is at work on a Government order for heavy machinery used in the manufacture of steel projectiles for big guns, and is figuring on another Government order for 50 similar machines, to be turned out in from 10 to 16 days. Work is being rushed night and day to complete orders.

W. L. Washington, of the Washington-Elliott Steel Co., New Castle, Pa., has sold his interest in that concern to George D. Blair, of Pittsburg. The new concern will be known as the Elliott-Blair Steel Co The plant has more than doubled in size since Mr. Washington took an interest in it several years ago. Mr. Blair is connected with the Iron City Fire Brick Co., of Pittsburg.

A unique device is being installed in the new boiler house at Cleveland Water Works, Division st., pumping station, for removing ashes and refuse to the outside of the building. The apparatus is being built by the Brightman Furnace Co., Cleveland, and is to be used in connection with Brightman mechanical stokers that will be installed under Geary water tube boilers. It consists of a cast iron spiral conveyor 85 feet long for delivering the ashes and refuse to a bucket elevator placed on the outside of the building. The engine driving the stokers will operate this conveyor and elevator. This plant, when completed, will constitute one of the most modern and economical boiler house equipments in this part of the country. The Brightman Furnace Co. is now working on a large consignment of stokers for Japan, besides several for domestic shipment. It has just placed two stokers in the Garlock-Frazee new laundry building, in a fine and thickly resident part of Cleveland, as it was necessary that this building be provided with stokers practically smokeless in their operation. The company reports a busy season, with still brighter prospects for the future.

The Brown Hoisting & Conveying Machine Co., of Cleveland, has received the contracts from the Government for the building of eight coal loading machines for four coaling stations on the Gulf of Mexico. The amount to be paid for this work is $151,000. The foundry of Taplin, Rice & Co., Akron, O., is busy on castings for this contract.

Car and locomotive building: The Toledo & Ohio Central is ordering six freight locomotives. The Rutland Railroad will buy from two to six. The Canada Atlantic has placed an order with the Baldwin Locomotive Works for 16 freight locomotives. The Ohio Falls Car Mfg. Co. is building 200 freight cars for the Nashville, Chattanooga & St. Louis. The D. L. & W. has placed an order for 200 freight cars with the Jackson & Woodin Mfg. Co., and has an option on 300 more. The Great Northern is ordering 1,000 cars from the Haskell & Barker Co. The Pennsylvania Road will probably order 2,000 box cars, and is asking proposals on 1,000 steel gondola cars. The Rock Island is building 85 stock cars. For the Texas Pacific, the Missouri Car & Foundry Co. is building 400 box and 100 coal cars. The C. & O. has received bids on 750 hopper bottom and 250

The closing down of the plants of the HP Nail Co., the American Wire Co. and the Consolidated Steel & Wire Co., Cleveland, preparatory to handing them over to the new American Steel & Wire Co. has been announced in sensational dispatches as the first proof of the policy of the new company.

It is, however, nothing of the sort. The inventory connected with the transfer, the new adjustments of local organization, and the arrangement of details on the new basis called for the shut-down, which lasts until April 11. The Cleveland plants will all be run, so far as can be seen now. New terms required to be made with the employes, to make the policy at all plants uniform.

It is the intention to start five of the ten 50-ton furnaces at the new basic open-hearth plant of the Carnegie Steel Co., Ltd., on Monday, April 11, and the remainder two weeks later. The new continuous billet mill at the Duquesne plant is approaching completion.

At Sheffield, Ala., the Cole Furnace Co. will blow in another furnace.

The Colbert Iron Co., at Sheffield, has blown out its furnace in consequence of legal difficulties. The Colbert Co. leased the old Hattie Ensley Furnace, which now belongs to the New Castle (Pa.) Engineering Works. The company manufactured about 160 tons of iron daily and found a ready sale for the product. The indebtedness for which an attachment was taken is said to be local and of no large amount.

The Link Belt Machinery Co., Chicago, recently installed a weighing, screening and loading plant for the Chicago, Wilmington & Vermillion Coal Co., of Streator, Ill. The coal is hoisted in cars, holding 3,800 pounds gross weight, on self-dumping cages, to a height of 27 feet above ground. At this point the coal is discharged into a steel weigh box operated by steam and suspended from the beams of a Fairbanks scale, with automatic dial attachment. By this means the weight in the box can be ascertained almost at a glance. The form of the box is such that the coal slides into and out of it easily and the breakage is imperceptible. Having obtained the weight the weigh-man, with a slight motion of a lever, opens a steam valve which controls the action of the weigh-box in such a manner that the coal easily and quickly slides on to the shaking screen. This latter consists of a counterbalanced pair of screens with cushioned connecting rods of a design adopted by the makers several years ago. The apron used in the loading of box cars is one for which patents are pending. It delivers the coal to a Ramsey reciprocating box car loader. This apron shakes with the screen, and can be withdrawn from or introduced into a box car by one man in seven seconds without stopping the screen. This equipment is weighing, screening and loading 2,000 tons of coal per day, nearly all, except the screenings, going into box cars. The capacity of the screens and weigh box is eight tons a minute.

At the Erie City Iron Works, Erie, Pa., wages were increased 10 per cent with April 1.

The Driggs-Seabury Co.'s steel foundry, now under construction at Derby, Conn., is expected to start by April 20.

The Minnesota Iron and Steel Co., Minneapolis, is now running day and night and 350 men are at work, against 190 when the plant started up under the new management. Work is being pushed on the open-hearth steel plant, which will be completed in the fall.

At Bangor, Me., a consolidation of the Hinckley & Egery Iron Co. and the Bangor Foundry & Machine Co. is about completed. The new company will be the Union Iron Works, and it will have a capital of $150,000.

Peoria, Ill., manufacturers are corresponding with a view to securing a malleable iron plant for that city. More than half a dozen local companies use malleables, and there has been considerable difficulty of late in getting orders filled promptly.

The stockholders of the New Castle (Pa) Wire Nail Co. have been called to meet April 25 to consider the proposition of selling the plant to the Shenango Valley Steel Co. It is reported that the latter, which recently purchased the Norway, or Raney & Berger furnace, also has under way negotiations for the purchase of the works of the New Castle Seamless Tube Co.

Ten new furnaces for making crucible steel are being built at the plant of the Crescent Steel Co., Pittsburg.

All departments of the Maryland Steel Co., at Sparrow's Point, Md., are busy, except the shipbuilding plant. There are now employed about 1,300 men. A 10,000 Australian order for steel rails is now in hand. Present contracts will run the plant to July.

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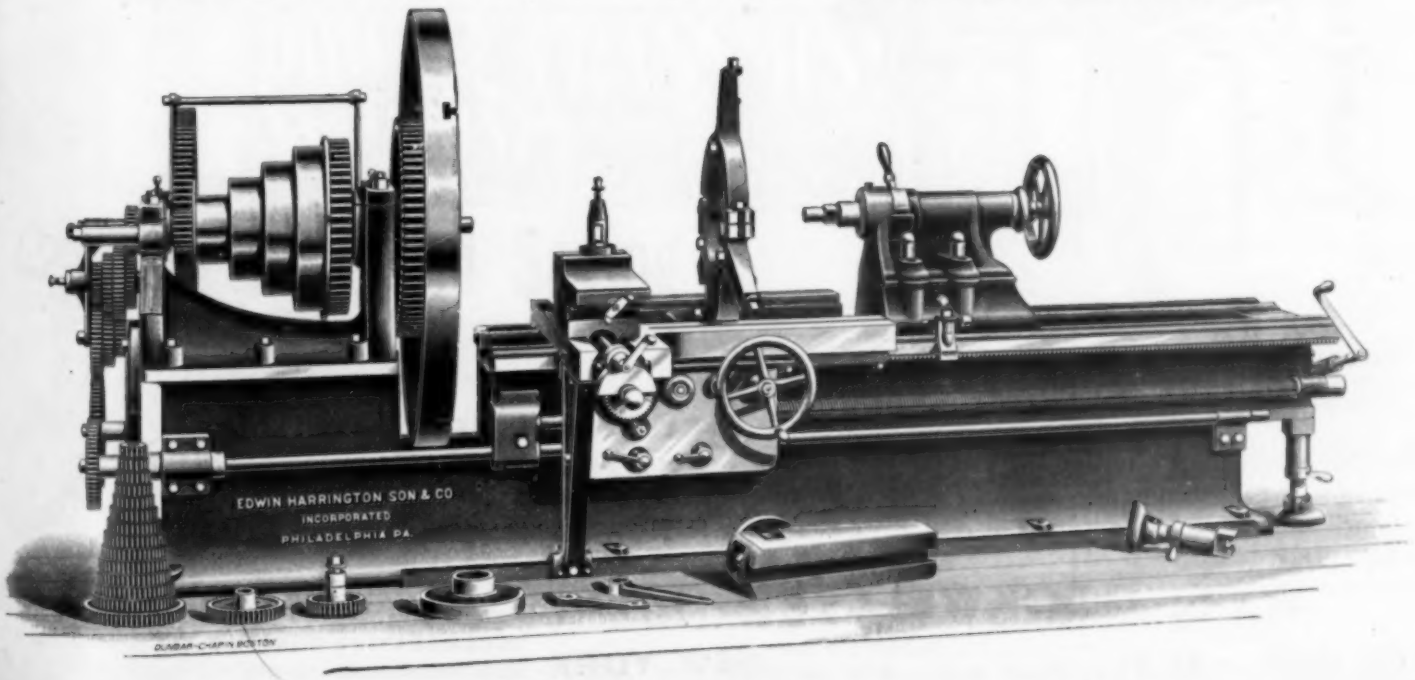

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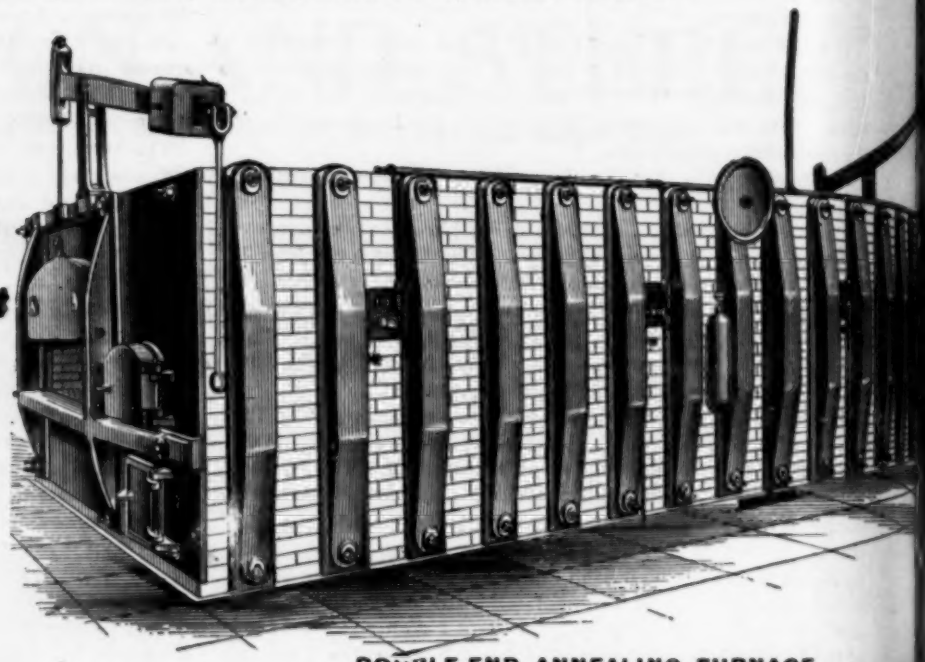

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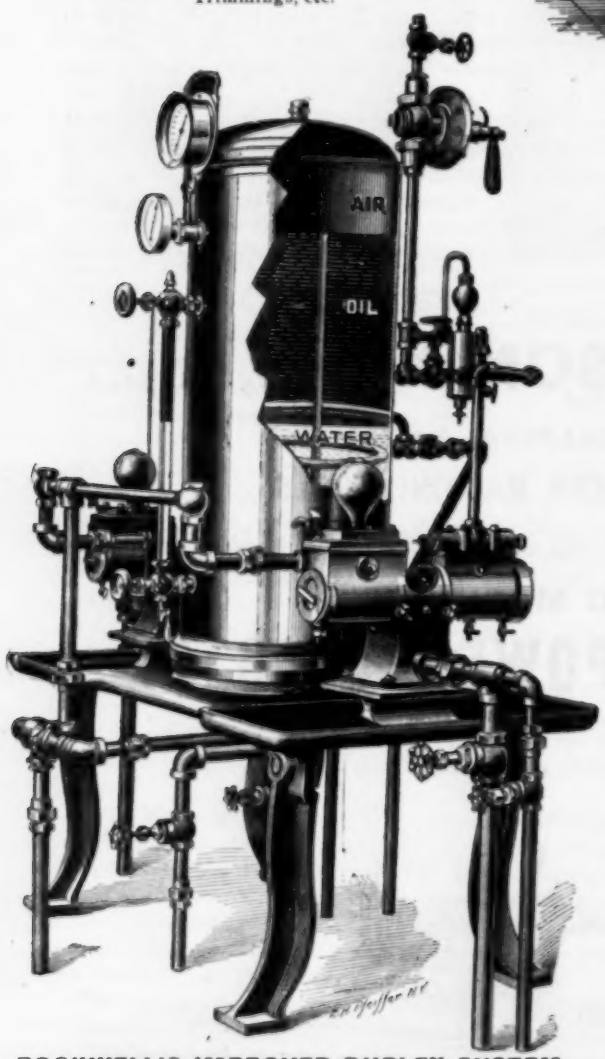

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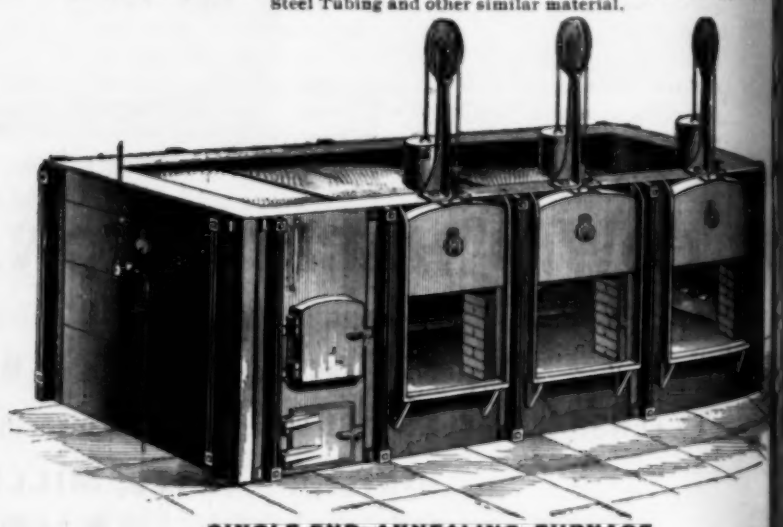

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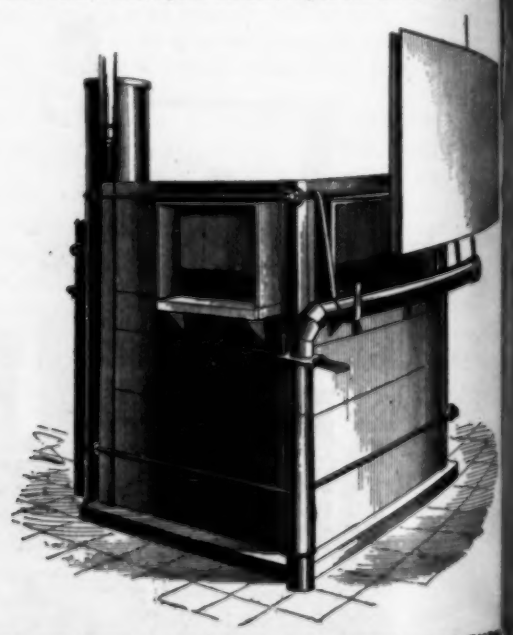

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